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CIVIL DEFENSE IN WESTERN EUROPE AND THE SOVIET UNION

FIFTH REPORT

BY THE

COMMITTEE ON GOVERNMENT OPERATIONS

APRIL 27, 1959.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed with illustrations

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LETTER OF TRANSMITTAL

HOUSE OF REPRESENTATIVES,
Washington, D.C., April 27, 1959.

Hon. SAM RAYBURN,
Speaker of the House of Representatives,
Washington, D.C.

DEAR MR. SPEAKER: By direction of the Committee on Government Operations, I submit herewith the committee's fifth report to the 86th Congress. The committee's report is based on a study made by its Military Operations Subcommittee.

WILLIAM L. DAWSON, *Chairman.*

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CIVIL DEFENSE IN WESTERN EUROPE AND THE SOVIET UNION

APRIL 27, 1959.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed, with illustrations

Mr. DAWSON of Illinois, from the Committee on Government Operations, submitted the following

FIFTH REPORT

SUBMITTED BY THE MILITARY OPERATIONS SUBCOMMITTEE

On April 22, 1959, the Committee on Government Operations had before it for consideration a report entitled, "Civil Defense in Western Europe and the Soviet Union."

After consideration of the report as submitted, upon motion made and seconded, the report was approved and adopted as the report of the full committee. The chairman was directed to transmit a copy to the Speaker of the House.

PART I—SUBCOMMITTEE OBSERVATIONS AND SUMMARY OF REPORT

NATURE AND PURPOSE OF REPORT

This report is presented by the Military Operations Subcommittee to inform the Congress and the American people of the civil defense programs in Western Europe and the Soviet Union. It is the fifth civil defense report of the Military Operations Subcommittee prepared in the course of its continuing study and investigation of civil defense matters during the past 4 years.

Previous reports were concerned with civil defense operations in the United States. Beginning in 1956 with a comprehensive analysis of civil defense concepts and planning and an appraisal of nuclear weapons effects, the Subcommittee subsequently has examined legislative, organizational and program aspects of Federal civil defense.[1]

The present report brings together for the first time in a single public document a systematic account of civil defense activities of eight NATO allies (Great Britain, France, Germany, Denmark, Norway, the Netherlands, Belgium and Italy), two neutrals (Sweden and Switzerland) and the Soviet Union as a great contending power.

The surveys of European civil defense are necessarily brief in view of the number of countries covered. The study of civil defense in Soviet Russia, based primarily on published Russian sources, is presented in considerably more detail because of the intense interest in the Soviet endeavors and the scarcity of information in the English language. The subcommittee believes that the study makes a signal contribution in an area virtually unexplored by the executive agencies of Government concerned with civil defense.

Part II of the report, dealing with civil defense in Western Europe, was prepared by Bernard K. Gordon, national defense analyst of the Legislative Reference Service, Library of Congress. Primary sources were the "NATO Civil Defence Bulletin" and the "International Civil Defence Bulletin," though much of value was found also in "Civil Defender," an American magazine no longer published, and in several foreign and American military journals. The NATO Civil Defense Office in Paris, the U.S. Office of Civil and Defense Mobilization, and officials of several NATO embassies in Washington also provided information.

Part III of the report, dealing with civil defense in the Soviet Union, was prepared by Boris I. Gorokhoff, U.S.S.R. specialist, Slavic and Central European Division, Library of Congress, and by Sergius Yakobson, senior specialist in Russian affairs, Legislative Reference Service, Library of Congress. Primary sources were publications of DOSAAF (Volunteer Society for Assistance to the Army, Air Force, and Navy), a Soviet paramilitary organization, and various special works of Soviet writers. A note on Russian sources will be found at the end of the report.

The subcommittee wishes to express its appreciation to the Library of Congress specialists who made these studies; to Roger Hilsman, Deputy Director of the Legislative Reference Service, who cooperated with the subcommittee staff in arranging for the studies; and to Herman Kahn, research associate at the Center for International Studies, Princeton University, who gave valuable advice in the initiation and preparation of this report.

Except for minor editorial corrections and rearrangement of several sections, the subcommittee has left untouched the content of the Library of Congress studies constituting parts II and III. The subcommittee's commentary is confined to part I.

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[1] Previous civil-defense reports prepared by the Military Operations Subcommittee are: "Civil Defense for National Survival" (H. Rept. No. 2946, 84th Cong., 2d sess., July 27, 1956); "Status of Civil Defense Legislation" (H. Rept. No. 829, 85th Cong., 1st sess., July 22, 1957); "Analysis of Civil Defense Reorganization" (Reorganization Plan No. 1 of 1958) (H. Rept. No. 1874, 85th Cong., 2d sess., June 12, 1958); and "Atomic Shelter Programs" (H. Rept. No. 2554, 85th Cong., 2d sess., Aug. 12, 1958).

Relevance of European Civil Defense

In presenting a survey of civil defense programs in Western Europe, the subcommittee does not presume to criticize any nation's effort nor to advise any of our NATO partners or other European friends as to how they might best prepare their nonmilitary defense. Rather, it is the purpose of the subcommittee to bring together factual data on these civil defense programs so that the Congress and the American people may be better informed on the problems of organizing the free world's resources to withstand the Soviet challenge.

Civil defense is one element of preparedness in Western Europe. It can be an important element in assuring the military and political strength of that key area in the continuing struggle against Soviet domination.

To the extent that civil defense strengthens the determination of the people of Western Europe to resist the pressure of Soviet threats, to the extent that it would reduce the impact of a Soviet attack, it adds to the total strength of the free world. In this sense, civil defense in Western Europe is no less related to our own security than is the military strength of NATO.

Apart from the crucial factor of strategic interdependence, the Western European experience in civil defense has many instructive lessons for U.S. planning and administration. Indeed, the British wartime experience in protecting the civil population against air attacks weighed significantly in the preliminary planning effort which led to the creation of the Federal Civil Defense Administration in 1950 and to the Federal civil defense legislation enacted early in 1951 (Public Law 81–920).

Almost every area of major concern to civil defense authorities in the United States is highlighted in the civil defense experience of Western Europe. These areas include civil-military relations in planning and operations and in the exercise of postattack authority; compulsory versus voluntary service in the recruitment of civil defense personnel; appropriate division of civil defense functions among Federal, State and local levels of government; legal responsibilities and duties in civil defense of the citizenry at large; varying official emphasis in protective measures such as evacuation and shelter construction; and problems of financing civil defense costs, including the possibile participation of private industry in sharing costs of protective structures having peacetime utility.

While we can benefit from European experience in civil defense activities, it is also apparent that the United States has much to offer our allies in the way of weapons-effects data of potential use in basic civil defense planning. As "nominal" atomic weapons have given way to megaton-range hydrogen weapons and as missiles have begun to supplement or supplant manned bombers, our allies have become increasingly dependent upon us for essential information on radiation hazards and other radically different problems associated with modern weapons.

Thus the French and West German Governments participated in the shelter tests conducted in Nevada in 1957 (Operation Plumbbob).

Together those two Governments contributed $600,000 and furnished a total of 14 underground shelters for testing purposes.[2]

With materials and instrumentation shipped from France and Germany, the shelters were built and the tests were conducted at the Nevada test site through contract arrangements with an American firm of consulting engineers.

The main objective of the projects was to observe the behavior of protective structures of German and French design and construction materials under blast conditions for the purpose of improving design criteria for future protective structures. The weapon used in the test was a 43-kiloton nuclear bomb mounted on a 700-foot steel tower. The shelters were located at distances from ground zero ranging from 280 yards to 1,440 yards.

In addition to the tests conducted for the French and German Governments through the use of French and German instrumentation, U.S. agencies also provided extensive supplemental instrumentation for other test purposes.

Subject to the procedures and limitations imposed by the security regulations of the U.S. Atomic Energy Commission, the test results are being furnished to the French and German Governments.[3]

To a certain extent, the Western European countries are looking to the United States for leadership and guidance in basic civil defense concepts and doctrine as well as in the development of technical information. Although several countries have made considerable progress in areas where the United States has done very little, notably in the construction of shelters and the formation of trained civil defense operating units, U.S. sources of civil defense information are welcomed.

The subcommittee was interested to hear from Danish civil defense authorities that one of their chief sources of information on basic civil defense concepts and doctrine is the subcommittee's 1956 report entitled "Civil Defense for National Survival" (H. Rept. No. 2946, 84th Cong., 2d sess., July 27, 1956) and the seven volumes of printed hearings on which that report was based.

While it is difficult to generalize about comparative levels of civil defense effort in the countries surveyed, which differ in geographical size, population, wealth, and strategic importance, available budgetary data suggest that the United States is among the lowest in proportion of expenditures for civil defense in relation to military effort. As shown in the following table, in fiscal year 1957 the United States spent less than two-tenths of 1 percent of the amount spent for military purposes. The average yearly expenditures for civil defense in the United States are closer to one-tenth of 1 percent of military expenditures. The Scandinavian countries and Switzerland have the highest ratios.

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[2] See "Atomic Shelter Programs" (H. Rept. No. 2554, 85th Cong., 2d sess., Aug. 12, 1958), p. 10.

[3] See "Test of French Underground Personnel Shelters; Preliminary Report Submitted to Service National de la Protection Civile by Ammann & Whitney, Consulting Engineers, New York City, U.S.A.," September 1958; and "Test of German Underground Personnel Shelters; Preliminary Report Submitted to the West German Federal Republic by Ammann & Whitney, Consulting Engineers, New York City, U.S.A." September 1958.

Comparative military and civil defense budgets, 1957

Country	Military budget	Civil defense budget	Ratio (percent)
Switzerland	$284, 287, 300	[1] $7, 100, 000	2.5
Sweden [2]	396, 814, 000	7, 738, 700	2.0
Norway	143, 917, 000	3, 000, 000	2.3
Denmark	121, 500, 000	3, 920, 000	3.2
Germany	1, 853, 640, 000	25, 000, 000	1.3
Netherlands	486, 360, 000	6, 300, 000	1.3
Belgium	380, 179. 000	2, 413, 000	.6
Great Britain [1]	4, 505, 200, 000	37, 000, 000	.8
France	3, 557, 000, 000	2, 900, 000	.1
Italy	934, 400, 000	[3] 1, 607, 000	.17
United States [4]	38, 400, 000, 000	63, 000, 000	.16

[1] Estimated.
[2] 1954–55.
[3] Includes National Fire Service.
[4] Expenditures, fiscal year 1957.

Strategic Aspects of Civil Defense

The strategic situation presently existing between the East and West, or specifically between the Soviet Union and the United States, has been characterized by one military analyst as a "delicate balance of terror," with the two major world powers possessing military strength sufficient to devastate each other in the event of an all-out nuclear war.[4]

There can be no disputing the fact that an exchange of nuclear blows between the United States and the Soviet Union would be crippling to both nations, assuming both were able to launch the bulk of their forces successfully. Whether one nation might destroy the other's strategic forces in a surprise attack, whether mutual fear of retaliation will prevent either from striking the first blow, or whether through some miscalculation an exchange of blows might come about by accident, are questions which haunt military planners and thoughtful citizens alike.

The salient fact arising from the current strategic situation is that no nation can afford to rule out the possibility of a massive thermonuclear attack on its people and its resources, regardless of the military power it may have in its own arsenal.

There are, however, certain things a nation can do to improve its chances of not becoming involved in a thermonuclear holocaust, or to minimize the destruction that might result should it be attacked. It can attempt to deter such attack by posing a threat of overwhelming retaliation; it can build up active defenses in an effort to ward off the blow or reduce the number of weapons that might actually strike their targets; and it can, through nonmilitary measures, reduce the damage that would be caused by the weapons placed on target by the enemy.

The cornerstone of U.S. military policy in the face of mounting Soviet belligerence has been the maintenance of large offensive deterrent forces, with a gradual buildup of air defenses. Almost no effort has been devoted to the task of preparing the Nation to withstand the terrible effects of an enemy attack, should our offensive forces fail to deter such an attack.

[4] Wohlstetter, Albert, "The Delicate Balance of Terror," Foreign Affairs, January 1959.

At the same time, despite our substantial deterrent capability, no one can assure the American people that this Nation will not be attacked. While we fervently hope that thermonuclear weapons will never descend on American cities—or on any city in the world—there is no absolute safeguard against such a possibility.

This subcommittee is convinced that the United States and its allies must be prepared to cope with any situation the Soviet Union might create, including the destructiveness of a thermonuclear war. To be unprepared to accept—as a last resort—the consequences of nuclear weapons would constitute a further invitation to Soviet aggression.

The subcommittee has contended, and recent authoritative studies have confirmed, that achieving protection from the effects of thermonuclear weapons is by no means a completely hopeless task, as so many people seem to believe. As devastating as thermonuclear weapons may be, their lethal effects, particularly those of fallout radiation, can be substantially reduced by nonmilitary defense measures prepared in advance of an attack. A nation ravaged by nuclear assault can still survive, sustain itself, and restore viable economic life, provided the problems of civil defense planning and preparation are squarely faced, carefully analyzed, and systematically resolved by effective Government action.

The U.S. Naval Radiological Defense Laboratory, the Operations Research Office of the Johns Hopkins University, the Rand Corp., the Rockefeller Brothers' Fund Study Panel, and, according to unofficial reports, the celebrated Gaither Committee, as well as other study groups, have concluded that civil defense against thermonuclear weapons is feasible and necessary.[5]

The findings of these studies underscore the importance of civil defense, not only as a means of saving lives and insuring the restoration of our economy, but also as an added deterrent to a possible enemy attack.

From the enemy's standpoint, a strong civil defense in the United States would mean first of all that our strategic strike forces will be used if necessary, despite the consequences of a return blow by the enemy. It would mean our stern warnings that aggression will be resisted are no idle threats.

A strong civil defense in the United States also would mean that a successful strike against the United States would require a much greater effort on the part of the enemy. That is, it would cost the enemy a great deal more to achieve any given level of destruction. This factor could be extremely important over a long period of time in preventing the Soviet Union from building up a decisive margin of power.

The same general considerations apply to civil defense preparedness on the part of our allies, particularly in Western Europe. If our NATO partners are not reasonably well prepared in civil defense, can they be counted on to carry out their NATO commitments in the face of menacing Soviet behavior?

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[5] U.S. Naval Radiological Defense Laboratory, "Radiological Defense Measures as a Countermeasure System," USNRDL–TR–74, Feb. 15, 1956; "Defense Against Aircraft and Missiles," classified report prepared by the Operations Research Office for the Department of the Army, August 1957; the Rand Corp., "Report on a Study of Nonmilitary Defense," July 1958, reprinted in: House Committee on Government Operations, Military Operations Subcommittee, hearings on civil defense, April and May 1958 (85th Cong., 2d sess.), pp. 477–497; and Rockefeller Brothers Fund, "International Security—the Military Aspect" (Panel Report II of the Special Studies Project), 1958.

At the same time, our allies may well ask whether the United States is serious in its commitments to NATO. If it is concluded that the United States has no intention of risking a direct conflict with the Soviet Union in the event of Soviet aggression in Europe, the entire system of collective security is endangered.

Civil defense, in other words, is clearly relevant to the Western strategy of seeking to deter aggression. A strong civil defense can indicate to a potential aggressor the seriousness of our intentions, while a weak or ineffective civil defense might cause the enemy to underestimate our determination to resist encroachment on our own interests or on those of our allies.

With these considerations in mind, Herman Kahn, in a study published by the Rand Corp. and presented to the subcommittee, has stated the problem as follows:

> There is an enormous difference in the bargaining ability of a country which can, for example, put its people in a place of safety in 24 hours' notice, and one which cannot. If it is hard for the reader to visualize this, let him just imagine a situation where the Russians had done exactly that and we had not. Then let him ask himself how he thinks we would come out at a subsequent bargaining table.[6]

At the present time, the United States lacks the means to protect its people in the event of nuclear war, and Soviet strategists cannot be unaware of our nakedness in civil defense. While our NATO allies and other European friends in certain respects are more advanced in civil defense, none can claim full civil defense preparedness.

The Soviet Union has developed a substantial civil defense program. Whether Soviet leaders believe their preparedness in this area is sufficient to tip the "delicate balance of terror" in their favor is not known at the present time.

This much is clear. The would-be aggressor possesses an enormous advantage, and consequently, his own civil defense planning need be less complex and costly to achieve desired measures of protection. Thus the aggressor has ample warning time to evacuate or shield his own population, for the decision to "strike first" lies with him. The defending nation is faced with the staggering tasks of planning to blunt and survive the first strike with, at best, minutes of advance warning, and in retaliation to "strike second."

Significantly, Soviet civil defense planning seems to be less concerned with warning time than do NATO or American defense authorities. As the study in part III points out, existing shelters are to be made ready, trenches dug, and certain other preparatory measures taken after an "alert" is sounded. Of course, the "alert" sounded by the aggressor to his own people has a vastly different strategic significance than the "alert" sounded in the defending nation after an attack has been launched.

While the available data indicate that Soviet civil defense measures in certain areas may not be as sophisticated as long range missiles with multimegaton explosive power might warrant, they indicate also that the whole Soviet population is being trained in the fundamentals

[6] Kahn, Herman, "Major Implications of a Current Nonmilitary Defense Study," the Rand Corp., 1958, p. 7.

of atomic defense and that considerable ingenuity is being shown in devising effective, though crude and inexpensive, measures of protection against radiation. The broad thoroughfares and parks in Russian cities and the wider dispersal of population and industry in contrast to our own heavily populated and industrialized centers, are among the advantages possessed by the Soviet Union from a civil defense standpoint.

Summary of Civil Defense in Western Europe

The most highly developed civil defense programs in Western Europe are those of Sweden, Denmark, Norway, and Switzerland. In general, all four of these countries have basic civil defense laws of long standing which recently have been revised to meet the additional requirements imposed by modern weapons. The people of all four countries are liable for compulsory civil defense service, and in each country large segments of the population have been trained in civil defense and large sums of money have been spent for shelter construction.

Other countries of Western Europe are markedly behind these four in the level of civil defense achieved to date, though there are indications of considerable improvement—notably in West Germany—in the near future.

Sweden

Sweden, with probably the most advanced civil defense program in the world, is noted for its deep-rock dual-purpose shelters and its underground industrial facilities, some of which have been visited by members of this subcommittee. At the present time the Swedes are building H-bomb shelters in the center of each city of over 50,000 population. Only limited evacuation of cities is planned in the event of a nuclear attack.

Denmark

Denmark, ranking second only to Sweden in level of civil defense preparedness, has developed its program around a system of shelters and highly trained mobile columns for disaster relief and rescue operations. The construction of shelters in private dwellings is required by law and public shelter construction is proceeding at a rate of 500 to 600 shelters per year.

Norway

In Norway, where there is also a requirement for shelter provisions in private dwellings, evacuation planning is now giving way to primary reliance on shelters, with only limited evacuation. As in Sweden, dual-purpose deep-rock shelters are being constructed

Switzerland

Switzerland, already among the most advanced in civil defense preparedness, recently embarked on a new and ambitious program to construct additional shelters and to improve presently existing ones. New emphasis also is being placed on civil defense training.

Swiss towns of over 1,000 population are required to maintain local civil defense systems, and all organizations of more than 50 persons are required to have trained civil defense units.

Germany

Of all the countries of Western Europe, West Germany appears to be advancing most rapidly in civil defense. After a postwar interval of inaction, the West Germans enacted basic legislation in 1957 and embarked on a vigorous civil defense effort, emphasizing the construction of new shelters, the rehabilitation of some 3,000 existing shelters, and the incorporation of shelter space in the construction of new buildings. Rapid warning and shelter protection are now the cornerstone of West German civil defense, with evacuation and rescue services as secondary measures.

Although primary authority and responsibility for civil defense are vested in the Federal Government, the system is a decentralized one, with provincial and local governments participating on a large scale.

Volunteer organizations also appear to be functioning effectively in technical training activities, with substantial direct assistance from the Federal Government.

Great Britain

With a civil defense history dating from initial planning begun in 1924, and with probably the finest civil defense record of any country during World War II, Britain established the basic pattern of civil defense prevailing in many parts of Europe today.

The British program is highly organized and includes a large number of well-trained civil defense personnel, but its orientation is basically postattack in nature. Primary emphasis is given to rescue operations, rather than to protective measures.

The British program is essentially an outgrowth of World War II civil defense concepts and measures.

Although a large measure of civil defense responsibility rests with local communities, the central government is able to exercise sufficient control over the entire program, due to the centralized nature of the British system of government.

Belgium and the Netherlands

The Belgian and Dutch civil defense programs are similar to that of the British, with the exception that attention is now turning toward shelter construction. Both Belgium and the Netherlands have begun shelter construction programs, but the primary effort in each country is geared to postattack civil defense measures.

France and Italy

At the present time, France and Italy—two important NATO partners—are almost totally lacking in civil defense preparedness. Italy has no civil defense law and no formal civil defense organization. The French program has few volunteers, includes only limited training activities, and is based on evacuation and postattack rescue operations.

In France, however, there are indications of impending change. Shelter needs are receiving increased emphasis in the allocation of funds for civil defense purposes and civil defense officials reportedly are planning now in terms of a multibillion dollar shelter construction program over a period of several years.

As noted elsewhere in this report, the French also have participated in shelter tests conducted at the U.S. Atomic Proving Grounds in Nevada.

Summary of Civil Defense in the Soviet Union

Doctrine

Soviet civil defense doctrine has been oriented for nearly three decades toward protection against conventional bombing and chemical attack. However, provisions for atomic defense were added in 1954, and for biological warfare in 1955.

Until recently, civil defense plans remained substantially the same as they were in World War II. However, a revision of plans appears to have taken place early in 1958. New features include a partial evacuation of large cities (limited to children and other persons unable to work), the setting up of organizations to provide for large numbers of persons made homeless by bombing, and, apparently, increased attention to civil defense in rural areas and to attacks made with little or no advance warning.

Organization

The Soviet civil defense system is controlled by the Ministry of Internal Affairs (MVD) through officer staffs in large cities. While troops may be assigned to the civil defense system in wartime, heavy reliance is placed on civilian personnel and equipment. The MVD's work is closely coordinated with that of local government authorities, with the former in charge of operations in case of attack, and the latter responsible for civil defense preparations.

In large cities, civil defense work is to be performed under the direction of MVD staffs by municipal departments (firemen, police and others), by groups of specially trained civilians drafted at industrial plants, apartment houses, and other establishments, and by the uniformed troops. The preparedness of the organization at the present time is difficult to ascertain, although the MVD staffs are known to be functioning at present. Little information has been published on readiness of civilian units in factories and industrial organizations.

In smaller towns and in rural areas, civil defense work appears to be left to civilians, under guidance from the MVD and the Soviet paramilitary organization. Sovet writers report that progress is good in some districts and poor in others.

Figures on the Soviet civil defense budget have not been revealed. Expenditures are divided among the MVD, local governments, industrial ministries, and "voluntary" societies which provide the population with general civil defense training.

Protection Against Bombing

A dispersal program for Soviet industry, effective since 1931, has resulted in the establishment of many new cities throughout the U.S.S.R., although Moscow remains a key industrial center.

Civil defense authorities have had (and possibly still have) some voice in the approval of blueprints for new construction. General instructions have been issued by the civil defense authorities to architects designing new buildings. Civil defense considerations are also responsible for the broad streets and the wide spaces between buildings in many Soviet cities.

In case of attack, the residents continuing to work in cities are expected to use roofed trenches, subways, shelters with reinforced concrete roofs (often in basements), and other similar measures.

Civil Defense Operations

While more emphasis has been placed recently on defense against attack in case of a sudden outbreak of hostilities, Soviet civil defense plans as a whole still appear to be based on the concept that ample warning would be given. Thus, existing shelters, as a rule, do not appear to be kept in constant readiness.

Furthermore, many of the preparatory measures—including the digging of trenches—are not to be undertaken until the Government announces an "alert."

On the approach of enemy aircraft, an "alarm" is sounded; a "chemical attack" signal is given when the use of chemical, radioactive or biological weapons is detected.

Defense measures include blackouts, camouflage, fire prevention, the use of gas masks and protective clothing, and the decontamination of persons, objects, and land. Many procedures originally set up against poison gas have been adopted with only slight modifications for use against radioactive dust. Current measures against fallout appear to apply to atomic, rather than to thermonuclear weapons. Secret civil defense equipment has been hinted at in Soviet publications.

Availability of Equipment and Facilities

The subways in Moscow and Leningrad appear to be large enough to shelter only a fraction of the population of those cities. Possibly 1 million persons could be sheltered in the Moscow subways, representing about one-fifth of the city population excluding the suburbs. However, if there are not enough shelters in existence, the problem is handled by issuing instructions to the population to dig their own shelters.

While statistics on the Soviet motor vehicle pool are available, it is difficult to estimate how adequate it would be to effect an evacuation of cities, since much would depend on the circumstances surrounding such an undertaking.

Training

The Soviet Union has an extensive compulsory program underway to train the population as a whole in the fundamentals of civil defense, through courses involving lectures and practical training. The Soviets claim that the majority of their citizens have had at least 32 hours of civil defense instruction since 1955, and that even more training is to be provided shortly.

The lessons include the use of gas masks against real poison gas for short periods and the extinguishing of fires.

The scope and intensity of the mass training program probably means that more people have learned the fundamentals of civil defense in the Soviet Union than in any other country.

Little data have been published on the progress of specialized training of the civil and military personnel enrolled in the civil defense organizations, as distinguished from the instruction given the population as a whole.

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In case of attack, the residents continuing to work in cities are expected to use roofed trenches, subways, shelters with reinforced concrete roofs (often in basements), and other similar measures.

Civil Defense Operations

While more emphasis has been placed recently on defense against attack in case of a sudden outbreak of hostilities, Soviet civil defense plans as a whole still appear to be based on the concept that ample warning would be given. Thus, existing shelters, as a rule, do not appear to be kept in constant readiness.

Furthermore, many of the preparatory measures—including the digging of trenches—are not to be undertaken until the Government announces an "alert."

On the approach of enemy aircraft, an "alarm" is sounded; a "chemical attack" signal is given when the use of chemical, radioactive or biological weapons is detected.

Defense measures include blackouts, camouflage, fire prevention, the use of gas masks and protective clothing, and the decontamination of persons, objects, and land. Many procedures originally set up against poison gas have been adopted with only slight modifications for use against radioactive dust. Current measures against fallout appear to apply to atomic, rather than to thermonuclear weapons. Secret civil defense equipment has been listed at in Soviet publications.

Availability of Equipment and Facilities

The subways in Moscow and Leningrad appear to be large enough to shelter only a fraction of the population of these cities. Possibly 1 million persons could be sheltered in the Moscow subways, representing about one-fifth of the city population excluding the suburbs. However, if there are not enough shelters in existence, the problem is handled by issuing instructions to the population to dig their own shelters.

While statistics on the Soviet motor vehicle pool are available, it is difficult to estimate how adequate it would be to effect an evacuation of cities, since much would depend on the circumstances surrounding such an undertaking.

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PART II—CIVIL DEFENSE IN WESTERN EUROPE

CIVIL DEFENSE IN NATO

Great Britain

Britain, of all the European NATO allies, is presented with a strategic problem which most closely resembles that of the United States. If anything, her defense task may be more severe: Britain's highly skilled population and industrial plant are concentrated in a very few urban centers, on a total land area much smaller than ours, and of course much closer to the Soviet Union. In addition, the British possess their own nuclear weapons, and this factor, along with the presence of important American manned bomber and missile sites, further adds to the country's attraction as a target for enemy attack.

BRITAIN TRADITIONALLY INTERESTED IN CIVIL DEFENSE

It may be said that the current threat which faces the British people is at base an enormous magnification of the problem of air raid protection with which they have been concerned for more than 30 years. Secret research and planning work for civil defense was begun in England as early as 1924, when an air raid precautions committee was set up. It is interesting to find that the present NATO civil defense advisor, Wing Commander Hodsoll, became secretary of this initial British body in 1929. But the formal date for the beginning of civil defense in England is 1935, when an air raid precautions department, with Hodsoll in charge, was created in the Home Office. Two years later the first legislation in this field was passed, and local authorities were obliged under this law to help provide for their own civilian defense.

Nevertheless, most of the preparations and the organization which performed so well during the war were actually built up in a relatively short period, during late 1939 and early 1940. The work which the British accomplished in fire and damage control, rescue, and the use of mobile columns earned them the reputation of the world's finest civilian defense organization, despite the lack of early planning. At the end of the war the organization and training of civil defense personnel came to an end.

The postwar program dates from 1948, when the Civilian Defence Act was passed. For a variety of reasons, expressed by leftists, pacifists, Communists, and others, there was a degree of opposition to the bill, and the passage of the act was accompanied by some bitter debate among many backbenchers. The structure which was provided for by this enabling legislation is altogether a civilian organization, based as it was during the war, on the volunteer Civil Defence Corps. Though in recent years there has been increasing talk of somehow integrating civil defense into the military services, the civilian concept still prevails.

The entire effort is directed by the Civil Defence Department of the Home Office, while ultimate responsibility, particularly in case of conflict, lies with the Defence Committee of the Cabinet. Within the Civil Defence Department itself there are two divisions: one working on plans which concern primarily the parent Home Office, and one division which concentrates on plans involving the jurisdiction of other ministries, such as Health, Works, and Food, among others. Even further coordination with the work of other ministries is the goal of the joint planning staff, whose membership comes in part from outside the Civil Defence Department. The chairman of the group, however, is the planning officer of the department itself, and the members are the vice chiefs of the fighting services, along with high-level representatives of the interested civilian ministries.

British traditions of government, as well as the small size of the country and its consequent vulnerability to air attack, all require that the lead in civil defense should be largely a function of the central government. Nevertheless, the Home Office and Cabinet have maintained that the responsibility for carrying out detailed plans must rest with the units of local government, and through its power to offer or withhold grants, the central government has encouraged the local bodies to participate actively in civilian defense.

But local support has not always been warm, as some of the difficulties which accompanied the initial passage of the bill hinted even in 1948.[1] The advent of the hydrogen weapon simply aggravated the feeling of helplessness and futility with which a large minority already regarded civil defense. In addition, there has been opposition to civilian defense programs on the ground that they help engender tensions, but this attitude is less frequently encountered.

THE CURRENT EFFORT

Despite this background of occasional, mild, and spotty opposition, the British have built a formidable civilian defense organization, which, while predominantly paid for by the central government, is manned by volunteers throughout the country, and organized on a local basis. In 1958 a total of 704,296 persons were organized into the several civilian defense organizations. The backbone of all these is the Civil Defence Corps, with a present strength of 359,405. An additional 135,000 are members of various allied services, and the industrial civil defense organization alone commands the support of 209,323 workers.

In September 1954, the London Times represented the annual cost for all these services at $84 million, almost all of which was borne by the central government.[2] Other estimates indicate that total

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[1] The feeling, expressed in 1948, that in the atomic era civil defense is meaningless, continues to have wide support in England. This is particularly understandable in the British case given the memory of the heavy bombing attacks of 1940 and 1941. Britishers are aware, after all, that in one of the heaviest attacks on London, in which there were more than 3,000 casualties, "only" 600 tons of explosives had been dropped, and that in order to that job, literally scores of German aircraft had been required.

A single atomic bomb of nominal power (20 kilotons), on the other hand, is far more readily deliverable, and one such weapon has a destructive power ratio of 33.1 when compared with the bombs dropped during the "blitz." It has recently been estimated that such a "nominal" atomic weapon, if burst over central London during daytime hours, would have the following effects: (*a*) 40,000 killed; (*b*) thousands more injured; (*c*) 100,000 homeless; (*d*) total devastation over 3 to 4 square miles; (*e*) major damage over 10 to 20 square miles; (*f*) hundreds of fires.

[2] London Times, Sept. 11, 1954. Costs for civil defense alone were $62 million.

costs, including capital expenditures, were even higher. For the same year, for example, the official figures reported amounted to a total of more than $218 million,[3] but this is far higher than the amounts actually set aside by Parliament for civil defense in 1954.

During more recent years, however, expenditures have run substantially lower, possibly due, among other factors, to a lessening need for continued high capital expenditures. In 1954–55, the sums reported were $50 million; in 1955–56, the total was $33 million. The most recent year for which figures are available is 1957, during which the combined expenditures of local and central authorities did not amount to more than $37 million. Only $3 million did not come from the resources of the central government, which in all cases is obliged to refund to the local bodies 75 percent of their approved expenditures. The central government, if it meets with local unwillingness to participate in the program, can carry on with necessary work anyway, and may charge the costs to the local units of government. As in the Coventry affair, this has proved to be a powerful weapon.

Nevertheless, in 1954, when expenditures for both civilian and military expenditures were at record heights, the proportion allotted to civilian defense amounted only to 1.3 percent of the expenditures for the fighting services. By world standards, of course, and particularly when compared to the record of the United States, this was a remarkably high figure, and placed Britain during that year behind only Sweden and Switzerland. But it must be admitted that even with this respectable budget figure, and with her three-quarter million volunteers, Britain's civil defense effort seems not to have come to grips with the challenge of modern weapons.

No evidence, for example, has been found to indicate that there exists in Britain any program for general population shelters, such as would be required to withstand either the blast or radiation effects of modern nuclear weapons. Instead, contemporary civil defense in England seems largely to be an extension of the practices of the Second World War. The fundamental concept of British civil defense is a combination of static and mobile measures. These practices are basically oriented towards the postattack period, and are designed to alleviate suffering, reduce the number of casualties, and lessen the extent of property damage. The Civil Defence Corps, and the industrial civil defense program, which together are the heart of the nation's effort, must be assessed in this light.

The Civil Defence Corps is divided into five functional sections: headquarters, warden, rescue, ambulance, and welfare. The headquarters section is responsible for report and control centers, communications, and technical reconnaissance (identification, location, and measuring the effects of forms of attack). The warden section, the link between the various services and the public, is responsible for general reconnaissance, administration of help at the scene of attacks, and for the organization of domestic "self-help" parties. The rescue section is in charge not only of all first-aid work, but also concerns itself with radiation decontamination and debris clearance. The ambulance section needs no further description, and the final

[3] Great Britain, Central Statistical Office, "National Income and Expenditure, 1958." London: H.M.S.O., 1958, p. 47.

section, welfare, has the enormous task of caring for all refugees: their shelter, feeding, and clothing.

Industrial civil defense, the other mainstay of the national effort, is the result of an agreement between the British industries and the Government; every factory with more than 200 workers is ordered to organize an industrial civil defense unit. It is clear, however, that there are many concerns which still have not participated in this scheme, several years after it was first organized in 1951. Nevertheless, some of the larger firms have hired their own civil defense personnel, and have invested in essential firefighting equipment in particular. With wider participation, the groundwork does exist for a reasonable hope that "unnecessary" damage to industrial plants could be avoided. As the recent Rand study points out, the early revival of industry in a complex state such as the United States or Great Britain is of vital importance to the rapid recuperation of the society itself. Planning in this field is an essential ingredient, and can be expected to have an inordinately large payoff.

Every volunteer connected with one of the civil defense services undergoes a period of specialized training, and there is an impressive network of schools and institutes established for this purpose. For the highest level personnel, there is the Civil Defence Staff College, which was opened in 1950, and which deals with the broadest aspects of the administration of civilian defense programs. The staff college was the first of its kind anywhere in the world, and it is indicative of the high regard which the British place on a well-trained force. In 1957 alone, 4,045 high-level officials attended this institution, and since it was opened the college has had a total attendance of 18,511.[4]

Nevertheless, as a recent British comment tells us:

> However efficient the Civil Defence organization and however well trained its members may be, there will always remain the most important problem of overcoming the indifference of the general public.[5]

This continues to be Britain's basic problem in civil defense, as it was in 1948. Seemingly, at least as indicated by its publication of "The Hydrogen Bomb" booklet, the British Government intends to bring to the attention of the people the enormous destruction made possible by the newest weapons. One aim of this step, of course, was to induce Britishers more willingly to support civil defense. On the other hand, there are indications that instead, rather more skepticism concerning the value of the entire program may have been the result of the Government's effort. Indeed, one recurrent criticism of the British program has been that while the Government continues to deplore the difficulty of attracting volunteers for civil defense work, it is itself offering no lead in the field. Publication of alarming booklets apparently is not enough to satisfy this criticism. Certainly, so long as London takes no more firm lead than it has, and especially in the absence of any visible shelter-construction program, the continuance of public apathy is a risk that is knowingly being run.

[4] Civil Defence (Geneva), October 1958, p. 3.
[5] Lt. Col. C. F. C. Bentley, "Progress in Civil Defence," The Army Quarterly, April 1958, p. 61.

FRANCE

In France, there is as yet no modern, large-scale and effective program for civilian defense. Very recently there have been steps to establish such a program, but to date comparatively little has been done. Among NATO countries, France is almost unique in that she has not enacted any postwar basic legislation in this field;[6] instead, certain basic planning has proceeded under the authority of an old 1938 law and a "decree," dating from 1951. This provided for civilian defense planning to be organized under the direction of the Ministry of the Interior, and made possible a certain amount of formal civil defense organization.

THE STATE OF THE CURRENT FRENCH EFFORT

This is not to say that there are not many Frenchmen convinced of the need for a more energetic program. Indeed, the present official in charge, M. Maxime Roux, is most active as a writer and speaker, and there are recent indications that the entire problem of passive defense is about to receive much more serious consideration than in the past. According to a proposed military reorganization under the new Fifth Republic, reports indicate that a National Defence Council is to be created and that under this scheme civil and military defense are to be coordinated. Another product of this reorganization would empower the cabinet to proclaim a state of alert or mobilization, and as a part of this planning, means are to be worked out to insure smooth succession of governmental authority under crisis conditions.[7] Other indications are that in the future, French veterans will be liable for a wider variety of nonmilitary reserve military obligations, and that these will include civil defense training, damage repair, and first aid.[8]

But as M. Roux, who is Préfet and head of the Civil Defence Service of the Ministry of the Interior, would be the first to admit, most French progress to date has been largely on a high-level, theoretical, and administrative plane. M. Roux himself said in April 1957 that France had spent, during the 5 years 1952–57 only $17 million on the civil defense program. He added, however, that double that figure would be a more accurate estimate, if all governmental costs relevant to civil defense were included.

Thus the usual approximation is that the French have spent, for the 5-year period 1952–57, a total of perhaps $43 million. This amount averages out to an annual expenditure of about $8.6 million. In 1956 the French military budget was $3.25 billion, and the proportion spent on civil defense that year was 0.1 percent.

TRAINING

Training of personnel in civil defense techniques has not advanced with great speed in France. It was pointed out in 1957[9] that she could not yet count among her civil defense resources a single volun-

[6] The most recent available information indicates that "a new law is under preparation."
[7] United Press International report, Jan. 5, 1959.
[8] New York Times, Dec. 31, 1958.
[9] Fifteen Nations, March 1957, p. 26.

teer on the permanent rolls. The "National School" for civil defense, which was opened in May 1954, at Nainville-les Roches, confines itself largely to the theoretical instruction of a student body drawn primarily from the higher levels of the bureaucracy. Attendance at the school is usually for a period of a week or two, and according to one report, the only activity which approaches practical participation in the work of civil defense is a ride in a helicopter.[10]

Apparently the school can train several hundred persons during the course of each year, and in its first year of operation 339 officials attended. One hundred of these were members of the prefectorial service, an additional 100 were special nominees and head clerks responsible for civil defense in the prefectures; 38 were departmental directors of rescue operations in wartime; 30 were police commissioners; 16 were staff college officers, and the remainder came from positions related in various ways to civil defense work.

The French seemed clearly aware of the deficiencies of having only one school for civil defense training, and particularly the gap that must exist between such high-level orientation courses and the need for large numbers of workers who are intimately familiar with actual operating techniques. It was announced early in 1955 that future courses at the school would concentrate to a greater degree on preparing instructors for "future regional schools." There was also to be more specialized training, as well as special courses for representatives of large industrial concerns, with the aim, it would appear, of encouraging a program of industrial civil defense, such as already exists in Britain and the Netherlands.

By the end of 1958, however, there was no indication that the French had carried through their plan to establish regional civil defense training centers. This lack of local participation in the national program is recognized as one of the country's most pressing civil defense problems, and those persons who are concerned with the problem concede that before France can claim to have an effective defense for her civilian population, there must be many more volunteers than the few who have so far participated in isolated exercises. This deficiency, as well as the need for greater decentralization, has been pointed out repeatedly by the French officials themselves.[11]

PLANNING

The basic concepts along which French planning has so far proceeded have been evacuation (tied in with some attention to industrial dispersal), a limited shelter program, and postattack help and rescue along familiar lines.

Evacuation

The French have termed their scheme for evacuation the "protective withdrawal plan" (PPE), and in order to draw up a program and make a start on this project, an organization of "PPE delegates" has been established. There are approximately 3,000 such delegates, most of whom are retired civil servants and military officers. Any scheme for evacuation depends, in the first instance, on a clear determination

[10] Ibid., p. 26.
[11] See "French Officials Go Back to School," Fifteen Nations, March 1957, pp. 24–27.

of the areas subject to evacuation, the classes of persons to be included, the areas to which they are to be sent, and the means for carrying out this scheme.

Under the French evacuation program, it is the responsibility of the PPE delegates to make these basic determinations, and it was expected that such retired personnel, with their long experience in the various cantons, arrondissements, and towns, would be best able to make the fundamental decisions according to the requirements of each area. Thus, a system of central guidance and local implementation was established, and according to Roux's statements in 1958, this continues to be the policy of France.[12]

The criteria which determine the work of the "delegates" has, however, been subject to change. The early plans for determining the classes of people to be evacuated held that "economically valuable" workers would be installed overnight in "dormitory areas" in the environs of the major population centers. Wider knowledge of the effects of the most advanced weapons has caused this scheme to be reconsidered, particularly because of the very wide radii of heavy destruction and fallout which must be expected given thermonuclear weapons.[13]

Postattack training

French progress in organizing for rescue and other postattack measures apparently has not satisfied those in charge of the civil defense effort. M. Roux has complained that despite early knowledge of the need for more sensible development planning, both with regard to buildings and transport routes, postwar construction has continued along worrisome lines. The need for broad avenues has largely been ignored, and construction of important and vulnerable factories and other installations has continued to center in the very heart of already overpopulated areas.

Similarly, the only large postwar civil defense exercise attempted in France demonstrated a number of important defects in organization and implementation. In "Exercise Strasbourg," in which 5,000 volunteers participated on a weekend in October 1957 and which was years in planning, communications in particular were found to be seriously faulty. There were no mobile columns in existence before the event itself, so that volunteers had to be called for. In their planning for such operations, the French have placed much emphasis on helicopters, and plan to purchase 100 machines for civil defense; yet, on the day of the exercise, bad weather and fog grounded these craft. It was found as well that radio facilities were far too restricted for the job undertaken, and individual messengers, not all of whom were even motorized, had to be used for communications. On the basis of this exercise, however, it was concluded that the people of France would volunteer for civil defense work, but that the central government, with some help from local authorities, would have to undertake a much greater program of material purchases if effective postattack measures were to become meaningful.

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[12] The warning system, of course, is a central responsibility, though Roux characteristically complained that it has not had sufficient funds. See Maxine Roux, "Protection Civile en France (II)," Revue de Defense Nationale, December 1958, pp. 1896–1907.

[13] Fifteen Nations, March 1957, p. 45.

Shelters

Partly as a result of these experiences, it is clear that some French officials are beginning to consider with greater urgency the relevance of shelters to a program of population protection. They have submitted several shelter designs to AEC tests conducted in Nevada, and their prototypes are reported to have stood up very well. But the French have felt that the costs of new shelter construction would in all likelihood be prohibitive, and M. Roux announced in 1957 that reinforcement of World War II shelters had begun. Apparently, French officials feel that shelter construction for all seriously threatened areas would be the "ideal" solution, but they recognize at the same time that this is probably an unattainable goal.

Nevertheless, M. Roux has written that in primary target zones France should consider the construction of public shelters with a blast resistance of at least 10 atmospheres (about 150 p.s.i.). These would be of two types: Small shelters with a capacity of no more than 100 persons, to facilitate rapid entry; and very large shelters, which would make possible permanent inhabitation for more extended periods.

Outside of the very heart of the most likely target zones, but still within threatened areas, Roux has proposed that the government should require shelter construction to be undertaken by landlords; he feels that while a rent increase would be likely as a result of this step, it would not be in excess of 4–5 percent. Under this scheme, public buildings such as schools and hospitals within threatened zones would be required to incorporate shelters at public expense. In semipublic structures, such as subsidized housing, shelters would be paid for by the builders, but government support would be extended in the form of an extension of the government's loan period.

In areas not so seriously threatened M. Roux has suggested that the government should either recommend or require the digging of slit trenches, as in the gardens of suburban areas, perhaps along with a more extensive use of France's numerous natural caves.

GREATER EMPHASIS IN THE FUTURE

It must be carefully be pointed out, however, that no such program has yet obtained wide public support nor authority of law. For the present and immediate future, it seems safe to state the French effort will continue to concentrate on planning and limited instruction. It must be added, however, that the entire problem of civil defense is now being considered with greater attention than at any time since the war. The two very recent and lengthy articles which were written by Préfet Roux for the Revue de Défense Nationale are good evidence of this attention.

M. Roux envisages, among other things, the organization of what appear to be para-military units, organized into "demi-brigades" of 2,500 men, with intensive and special training in all aspects of civil defense work. These would be located throughout the country, and would be available as well for work in areas other than those in which they are garrisoned. He foresees a 200,000-man antidemolition force, and a highly developed system of cooperation between the central government and the local authorities in a broad program of evacuation and shelters.

A final glance at French fiscal planning for civil defense affords some evidence of the renewed attention which it seems will be given to this problem. The amount of moneys recently allocated have not significantly changed: Neither in 1957 nor 1958 did the annual appropriation exceed $3 million; but the proportion devoted to different aspects of civil defense has altered.

For example, the sum devoted to educating the public in the needs of the program has been tripled, though admittedly it still is a small sum. The appropriations for the various postattack civil defense services were also very much increased. For 1958 they were budgeted at more than $1 million, which was a two-thirds increase over the amount allocated the previous year. Even more significant is the fact that while all moneys devoted to the shelter program up to 1958 had not amounted to more than $800,000, more than this, or $1 million, was appropriated for shelters during 1958 alone. Indeed, the latest information on the overall shelter program indicates that it is very ambitious, including the construction of fall-out shelters throughout the country, and is in addition to the planning for public and private shelters in target areas, which we have already mentioned. All in all, French civil defense planners envisage that the cost of their entire shelter program, spread over a number of years, will come to approximately $2.5 billion.[14]

Most important, Préfet Roux is acutely aware that France lags well behind most other NATO members; his pleas for action are well-spiced with comparisons drawn from the other European states and the United States. And none would deny that an early warning, literally and otherwise, is the first essential of any program for civil defense.

Germany (West)

Despite prolonged public apathy and resistance to even considering a renewal of civilian defense, West Germany has very recently embarked on a vigorous program. It promises to give her population a greater protection against the dangers of nuclear war than can so far be expected in any other NATO country.

The overall basic law which governs civil defense in West Germany was enacted as recently as October 1957, after 2 years of resistance in parliament. Some legislation was proposed and passed in November 1955, but the first unofficial postwar planning and tentative work on passive defense was begun even earlier: in 1951–52. Under the basic law of 1957, the entire program of Federal civil defense comes under the primary jurisdiction of a Civil Defense Department, organized within the Ministry of the Interior. Other Ministries, however, are responsible for a variety of functions relevant to civil defense. These are: Housing, Transport, Posts and Telecommunications, and Economics. The largest measure of authority, however, remains with the Civil Defense Department of the Interior Ministry, now headed by Herr W. Bargatsky, the successor to Herr Botho Bauch, an early and ardent advocate of the program.

[14] This information was supplied by the French Government to the NATO Civil Defense Adviser, at the request of the author of this report.

A FEDERAL-STATE PROGRAM

Two factors must be made immediately clear: West Germany has decided emphatically in favor of a decentralized system of civil defense, with a great deal of authority and responsibility left in the hands of Provincial (Ländern) and other local governments. This decision on a federated, decentralized system was itself arrived at only after a year-long parliamentary controversy on the question.

The second prime factor is that civil defense as it is now understood by West German officials is increasingly a question of shelter construction. For example, while the total civil defense budget was set at approximately the same figure for 1957 and 1958, the "Civil Defense Services," which in 1957 accounted for almost 80 percent of the total, in 1958 received only one-third of all civil defense appropriations. Shelters, on the other hand, were given far greater attention in the 1958 budget, and accounted for 20 percent, or $5 million, of all civil defense moneys. Given the power of modern atomic and thermonuclear weapons, the intensity of population in the country, and its location in Central Europe, evacuation and rescue are coming to be regarded as distinctly secondary to shelter in the German calculus of nonmilitary defense.

While much public reluctance had to be overcome, and is still a problem, the amount of progress which Germany made even without the 1957 legislation is remarkable. To a great degree, of course, the Germans' unwillingness to turn their minds to civil defense was the product of wartime experience and the resultant desire to avoid a repetition, even in thought, of the experiences of World War II. Conversely, it was possible to impress upon the people of Germany, as upon no other people with the possible exception of the British, that early and effective civil defense measures make a life-and-death difference.

To this end, for example, the volunteer Civil Defense Association has pointed out to the Germans that in the Second World War those areas with the best preparation suffered the lowest loss of lives. They are able to show, significantly, that in areas which suffered equal property destruction, human casualties were far lower in those zones which had established effective civil defense procedures. Westphalia, it was noted, lost 70–80 percent of its houses and buildings, but only 2 percent of its population. In this regard, it is worthwhile noting that in postwar civilian defense, the same area, the state of North-Rhine Westphalia, has already spent more than $25 million on civil defense, largely for shelter construction.

Clearly, much of such work antedates the passage of the 1957 legislation. The very large and important volunteer organization, known as the Technical Rescue and Maintenance Services (Technische Hilfswerk) was, for example, reestablished in 1952. Its complement is almost entirely made up of volunteers; indeed, even many of the instructors are volunteers. This organization receives most of its support from the Federal Government in Bonn, particularly for the maintenance of its two major schools, which have as a primary function the standardization of techniques throughout the country.

In addition, the service offers its basic courses at more than 400 local branches, which are located in all the States. And it should be pointed out that the courses offered, particularly those given at the main

institution at Marienthal, are of both a practical and theoretical nature. Indeed, any quick perusal of the German magazine in the civil defense field, Ziviler Luftschutz, will indicate the high degree of attention which Germans interested in civil defense currently give to the practical and technical aspects of the problem. Shelter construction diagrams and articles on the characteristics of various types of dosimeters and other equipment are common to its readers. Similarly, a basic function of the Marienthal school is to test new shelter designs.

But the Technische Hilfswerk is only one of the several legs upon which German civil defense now stands. The warning service, rightly regarded as the heart of any passive defense system, receives a great deal of attention in Germany. Civil defense officials feel that their warning problem, because of the short time-distance factor involved, is the most critical of all NATO countries. West Germany has organized a system of 10 warning areas, so that the director of the central warning centers may sound sirens throughout the country in a matter of only seconds.

The volunteer Civil Defense Association itself, with its headquarters at Cologne, is organized as well in all 10 Länder, and reaches down to all levels of the population through a myriad of subordinate agencies. It takes as its function the responsibility to bridge the gap between all the various civil defense services and the general population. Consequently, much of its work is public relations activity designed to educate and stimulate interest in the need for and needs of civil defense.

Part of the association's responsibility is the self-help warden service, which includes a very broad range of activities. Included are measures in institutional civil defense, including not only industrial civil defense, but among the state railways and the postal service as well.

All of these activities, as we have indicated, preceded the passage of the basic civil defense legislation in 1957. It was estimated, in fact, that in the 3 years before 1957, Germans had spent a total of $450 million for purposes of nonmilitary defense. The largest expenditures were directed toward training, planning, and toward both final and prototype shelter activities.[15]

Even in 1955, the Interior Ministry announced that it would propose a 3-year civil defense plan which would have a total cost of $250 million. Under that scheme, all new houses in communities of more than 10,000 persons would be required to incorporate private shelters. In public places, the Federal Government and the local authorities would cooperate to provide public shelters. At the same time, a civil defense force of 260,000 volunteers, raised in the 70 most volunerable cities and towns was envisaged. Part of this force was to be so organized that 30,000 men, formed into mobile columns, would be available for other areas as well.[16]

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[15] According to a statement of Interior Minister Schroeder in 1958.
[16] Civil Defender, November 1955.

THE SHELTER PROGRAM

Those sections of this 1955 plan which laid down shelter requirements found expression under a provisional program approved later that year. Under its provisions, all buildings erected after April 1956, in cities of more than 10,000 would be required to incorporate a shelter.[17] From that time on, the construction of new shelters, and the reinforcement of wartime structures, proceeded apace.

Late in 1955, Germany's first "atomproof" shelter was completed in Munich. It was designed to be blast, heat, and radiation proof, and was incorporated into a bank vault in the heart of the city. Within a year a small shelter was completed at Oberhausen, in the Ruhr, with walls 2 feet thick and a blast resistance of 9 atmospheres (130 p.s.i.). In and around Nuremburg a private society began plans to convert all old shelters (throughout Germany there are 3,000 still usable, though ordinarily they are larger in size than today's designs), as well as rock caves and cellars, into atomproof shelters. Late in 1956 it was reported that in Karlsruhe, three large shelters, each to cost $25,000, and with a capacity of 350 persons, were being constructed as part of the foundation for the Karlsruhe finance office. Similarly, in Dusseldorf, plans called for a large shelter to be constructed in the center of the city, with a peacetime capacity as a garage of 600 cars. New shelters are also to be found in the vicinity of Stuttgart, at Heilbrunn. Finally, a recent official estimate indicates that it will be possible to undertake extensive reactivation of existing public shelters. The cost would be approximately $25 million.

The overall concept which has guided German policy on shelters is the assessment that there are in the country perhaps 70 critical target areas, 25 of which are likely targets for nuclear weapons. The majority of the affected towns and cities have populations over 100,000, and, where possible, a combination of shelter and evacuation has become the goal of planning. In the main target towns, a 50 percent evacuation is being considered, and in certain of the most crucial and vulnerable target zones, some planning envisages an evacuation of as much as 90 percent. The remaining 10 percent are those in charge of vital work. Planning similar to the French, whereby these essential persons may be sheltered for short periods in atomproof structures, is in progress.

German thinking on shelters seems to have settled in agreement on three factors. Shelters must be compulsory; they must be small; and once made blast resistant, they will probably protect against prompt radiation, heat, and fallout as well. Herr Bauch was emphatic on the first point when he remarked that without compulsion, no shelter program could achieve full and necessary results. Germany, he wrote, would follow in the pattern established in Scandinavia, and would require the incorporation of shelters in new buildings.[18]

When the basic legislation was enacted late in 1957, chapter 5 of the bill provided that in all towns of over 10,000, shelters would be required in new construction. They would be built according to Federal specifications, and the aid of the State and local governments

[17] Die Welt (Hamburg), Sept. 20, 1955.
[18] Botho Bauch, "Shelters Can Mean Survival," Fifteen Nations, March 1957, p. 75.

would be given to those contractors whose buildings came under the subsidized construction program. The local governments, in addition, would be required to maintain and, if needed, build public shelters in their areas.

The size of German shelters, Herr Bauch also made clear, would be relatively small. Few would exceed a capacity of 50 persons, except for those located near large factories, railroad stations, and the like. The size of these larger shelters will probably be in the range of 250 to 1,500 persons; all to be constructed of reinforced concrete, with layers of soil to protect against radiation. They are designed to provide protection against atomic detonations of moderate size.

The cost of German shelters has been somewhat higher than American estimates in some cases, but the claim has been made that the protection they afford is also greater. However, there are indications that German reports have possibly confused American designs for "light" fallout shelters with German specifications for "moderate" blast shelters. Nevertheless, most recent reports indicate that German costs for such large shelters of 135 pounds per square inch resistance will be approximately $500 per person, and this estimate is closely in line with that given in the Rand report.[19]

COSTS OF THE GERMAN EFFORT

It seems likely that overall civil defense costs, in addition to the $450 million already expended by 1957, will probably translate into a Federal budget of approximately $25 million annually. In 1956, when Germany's military budget was $1.7 billion, civil defense expenditures were almost $22 million, a ratio of 1.2 percent. In 1957, the Federal civil defense budget was close to $30 million; in 1958 it was more than $25 million, and it must be remembered that substantial amounts are being expended by local authorities as well. For example, it was estimated in 1956 that total costs for equipping and training all civil defense forces (assuming 290,000 persons) would come to $122 million. Yet only one-third of this sum was due to be paid by the government in Bonn. Similarly, it was calculated that shelter restoration would cost $25 million, over a period of several years, and again, only one-third of the cost would be borne by the Federal Government.

It is clear, therefore, that West Germany has undertaken to establish a comprehensive effective program for passive defense. Her civil defense legislation established a range of broad powers available to State and Federal Governments, and both have shown a relative willingness to spend substantial sums for this development.

CIVIL DEFENSE IN THE EASTERN ZONE OF GERMANY[20]

For several years, the East German regime has steadfastly claimed that the civil defense programs of the NATO countries were another instance of warlike intentions on the part of the Western Allies. In recent months, that propaganda line has been put aside and ostensibly as a measure of reaction, the government at Pankow, with Soviet support, has begun to organize a civil defense establishment.

[19] Rand Corp., "Report on a Study of Nonmilitary Defense," July 1, 1958, p. 35. For German figures see NATO Civil Defense Bulletin, October 1957.

[20] Though East Germany is not, of course, a member of NATO, it is logical to discuss the East German program along with civil defense in West Germany.

This is a very recent development, since the first East German law on civil defense was passed only in October 1957, and came into force as recently as February 1958. In passing, it is worth noting that whereas it required several years of careful persuasion to get the approval of the West German Parliament for a civil defense bill, in the East German state the entire process was accomplished in a period of weeks or a few months. A substantial party and government propaganda effort was launched in order to bring this about, and much was made of decisions to rearm West Germany, and particularly of the likelihood of siting nuclear weapons on West German territory.

The legal authority given to the East German central authorities under the new legislation is far greater than that found in the law passed by the Bonn government. Ostensibly, civil defense is directed by the Interior Ministry, but the ultimate authority for civil defense is in the hands of a Russian general. Indeed, civil defense in the East is frankly regarded as another arm of the military services.

The only shelters so far provided for under the program are those which will house the armed forces of the country. Similarly, weapons depots of the Soviet forces are to be made bombproof, but no mention has yet been made of an intention to build underground plants or otherwise to shelter industry. On the other hand, whereas basic civil defense organization in West Germany is founded on a few large zones, shelter planning for civil defense in East Germany is organized on the basis of civil defense units in individual factories and other establishments.

The only available figures on the plan for overall civil defense indicate that the Germans plan, with Soviet support, to spend somewhat less than $1 million, for the period 1958–61. Initial plans, other than the limited shelter construction already mentioned, include the establishment of a small, highly trained force from the members of the Frei-Deutsche Jugend movement. This organization will form the nucleus of a larger organization which is expected to develop, and will concentrate primarily on training for postattack help and rescue. Finally, a radar-warning system is under development, financed not by the military establishment, but from the funds available to civil defense.[21]

Denmark

Denmark has had a modern civil defense program since 1949–50, when the present basic legislation was passed. (The country's first laws in this field were enacted before the war, in 1938.) The postwar program has undergone constant development and close scrutiny, and since late in 1956, a new high-level body has been charged with a fresh examination of the entire structure. This latest review is largely the result of the impact of hydrogen weapons and more advanced delivery systems, for most planning up to this time has envisaged protection only against conventional and smaller nuclear weapons. This is not to discredit Denmark's effort; indeed, it seems altogether likely that only Sweden, of all Western countries, is at present better prepared to survive nuclear war.

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[21] Udo Schütsack, "Das Luftschutzgesetz für die Deutsche Demokratische Republik," Ziviler Luftschutz, July 1958, pp. 154–157.

THE LAW AND THE PROGRAM

According to Danish law all persons between 16 and 65, excepting those already liable for military service, may be called upon to serve in civil defense. Nevertheless, the Danes have found that they can rely on volunteers to fill most of their ranks, and it has not been necessary to invoke this conscription law. It should be pointed out, however, that Danish military draftees, as they approach their year of required regular military service, may choose to serve in civil defense instead. Each year there are 1,200 such enlistments; these men serve 1 full-time year in civil defense, and for the following 9 years they must undergo further training on a part-time reserve basis. Altogether a total of 20 years' liability is involved, since the reservists then remain on the inactive rolls for a final 10-year period.

Most of these men are organized into Denmark's rightly famous mobile columns, which have a present strength of over 10,000, and a target complement of 18,000. Organized much like a standard military division into three brigades, and barracked at various places in the country, the mobile columns stand ready to provide very quick help and rescue service to the civil population throughout the post-attack period. It is clear that much of Denmark's civil defense efforts have been directed to this goal, and to evacuation as well.

In each town, for example, there is a local service organization, with a national membership of 20,000, which concentrates on fire control, rescue, and the distribution of emergency supplies. There is in addition an evacuation service which has a membership of a further 30,000. Finally, there are 40,000 people organized into self-protection units (in homes, factories, and rural districts), so that all volunteer forces have a strength of 90,000 people. The mobile columns strength of 10,000 or more must then be added, giving a total of 100,000 persons trained in aspects of civilian defense work. In a country of only 4.3 million, this is a more than respectable figure.

The mobile columns appear to be the "prestige" service, however, and as Mrs. Katherine Howard reported in 1956, there was some official feeling in Denmark that too much emphasis had been put on that one service at the expense of the other parts of civilian defense. It is not improbable that the current committee, which is chaired by the Prime Minister, owes some of its impetus to this attitude.

SHELTERS

All this is not to say that shelter construction has been ignored in Denmark's program, for the same basic legislation which provided for the establishment of the various civil defense services also called for a program of shelter building. Under its provisions all private structures built after July 1950, with the exception of small one- and two-family homes and commercial places employing fewer than 10 persons, must incorporate reasonably secure shelters. By and large this has meant reinforced, splinterproof cellars. Since the passage of that law a great many shelters can be found in the country, particularly on the outskirts of towns and cities, where most new building has taken place. The costs of such private shelters are borne by the individual owners of homes.

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In addition, the Government regards as its duty the provision of public shelters, both as a reserve to those privately built and in order to accommodate such persons as road and rail commuters. It is felt that for those who live in the most heavily built-up urban areas, sole reliance on private shelters would be insufficient. The structural requirements for the public shelters are stricter than for the simple "splinterproof" private shelters. Ordinarily they are built of reinforced concrete, up to 2 feet thick, and with a varying amount of soil covering. Most such public shelters have a capacity of only 50 persons, but there are a number of larger ones, especially those built to serve as garages in peacetime.

Denmark's goal in public shelter construction is protection for 25 percent of the population of the most developed towns and cities; thus shelter for 500,000 persons will be needed. Progress has been steady, with regard to both the private and public shelters. In 1956, there was a total of 1,802 shelters in the country, with a capacity of 187,067 persons. A year later, in April 1957, the number of shelters had increased to 2,461, with a total capacity of 231,397 persons. The Copenhagen area alone, with a population of 1,230,000 had 387 shelters, with a capacity of 64,000. But the city of Copenhagen itself has a population of 752,000 and it is in the city proper that the public shelters, with their 64,000 capacity, will be most needed

COSTS OF THE PROGRAM

Such goals, along with the costs of the several civil defense services, have made it imperative that Denmark should spend substantial sums of money on the program. In 1952–53, the annual expenditure was just over $5 million. This has dropped somewhat in recent years, to a level of around $4 million annually. In 1955–56, for example, the sum was $4,226,000, and in 1957–58, expenditures amounted to $3.92 million. In the same year, Denmark spent $121.5 million for the military functions of the three armed services and the home guard; thus civil defense expenditures were 3.2 percent of military expenditures in that year. In previous years, this ratio was reported to have been as high as 11 percent of the military budget; in terms of the individual Dane the cost per person may have been as much as $12.30 per year. But even the current 3.2 percent of the military budget is a respectable figure; in contrast, American expenditures on civil defense during fiscal 1958 were one-tenth of 1 percent of military expenditures.

NORWAY

Norway, as an active member of NATO, cannot afford to ignore the possibility that it may be exposed to bombing attacks during any future European or global war. Norwegians are convinced that defense of their civilian population is possible, and despite the scant resources of a country of only 3.4 million, they have built a notable system for passive defense. Indeed, Norway has been in the civil defense business since 1936, when the first law governing protection of the population against air raids was passed.

ORGANIZATION AND AUTHORITY

The present civil defense organization is under the control of the Ministry of Justice, and operates under authority of basic laws passed in 1953 and 1954, and since amended. This basic legislation divides the country (1,100 miles long and 250 miles wide at the broadest point) into 4 civil defense regions and 14 subregions. Civil defense is also organized from the bottom up, however, since in each of 135 towns and villages throughout the country there is a local organization in operation. The total strength of the local civil defense forces and the mobile columns is about 61,000, but considering all services, such as evacuation and self-help, about 300,000 Norwegians actually participate in civil defense—a figure equal almost to 10 percent of the country's population.

Since it was not possible to raise this large number entirely through the use of volunteers, Norway has reluctantly had to use conscription as well. This has been authorized since 1953, and all residents of the country, excepting only those men who are already mobilized in military service, are liable for duty of about 20 hours each year, for as long as 10 years.

The basic legislation providing for Norway's civil defense defines the functions of the organization in a fairly broad manner, but it seems clear that the emphasis, which in earlier years was on protection through dispersion and evacuation, seems now to have shifted somewhat to greater reliance on shelters and shelter construction. Norway still relies, however, upon the principle of strategic evacuation of nonessential persons from the main centers of population. In Oslo, for example, all children to age 17, their mothers, expectant mothers, invalids, teachers, and old people would all be evacuated. The evacuees would total 210,000 people, or almost half of the city's normal population. This is consistent with the basic program which calls for 50 percent evacuation of all other towns of 10,000 or more. For the country as a whole, the program means that 550,000 people would be relocated, an operation which is expected to require 4 days.

THE SHELTER PROGRAM

For those who stay behind, or in the event of a surprise attack, Norway is building shelters. It should be made clear, however, that there is no intention of providing shelter for all the population of likely target areas, since evacuation is an integral part of the total civil defense effort. The shelters include control centers and local depots, as well as public, private, and industrial shelters. There are 60 rock-embedded control centers now in use, and 203 depots, most of which are in sheltered rock tunnels. The cost of these control centers and depots alone has been about $4 million, and the program is not yet complete.

Shelters in private homes and buildings have been required by law since 1948, under a provision which requires owners to incorporate shelters into all new-home construction and into older dwellings still in good condition. This requirement is reasonably well enforced, and in the larger towns there are private shelters for 100,000 persons.

In addition to these private shelters, there is further accommodation for some 85,000 industrial workers in a large number of Norwegian factories. Many of these shelters are sunk deep into hard rock. All this is part of the program of the Industrial Civil Defense Organization, which has a staff (largely volunteers) of 40,000 men. A Royal Decree of 1954 laid down certain basic rules for industrial civil defense, and it was required, for example, that all industrial establishments with a staff of 40 or more must be responsible for organizing individual civil defense teams.

The Norwegian Industries Association established a volunteer organization in order to carry out this program, and it now has the participation of 1,530 plants, with a labor force of about 200,000. In establishments employing 200 people or more, 20 to 30 percent belong to the civil defense organization; establishments employing from 40 to 200 persons have civil defense teams comprising 30 to 50 percent of the total, and in very small plants each member of the staff ordinarily must receive training in civil defense.

Public shelters, largely designed for people caught outside at the beginning of an attack, are the joint responsibility of the Central Government and the municipalities, under an arrangement by which the Central Government refunds two-thirds of the cost. The national plan requires such public shelters to accommodate 20 percent of the normal population in the 50 most likely target areas; thus space is needed for 180,000 persons. According to information published by the Norwegian Embassy in Washington in April 1958, the country now has shelter space for 115,000 persons. For Oslo alone, where the goal is to provide shelter for 60,000, construction is now complete for a total of 34,000 persons.

The fiscal contribution of the Central Government to this national shelter program has been about $3.5 million, and its expenditures through 1955 on materials and equipment for all phases of civil defense were $8.5 million. For purposes of construction, the Government has spent an additional $14 million during the same period. It is clear from these figures that Norwegian expenses, particularly when related to the size of the population, have been relatively large.

Total figures indicate, however, that in the most recent years the annual Government expenditures have tended to decline, though it should also be pointed out that this tendency has not continued through the present fiscal year of 1958–59. In 1952–53 the figure was $5.8 million; 2 years later it was $4.1 million. For the coming fiscal year, on the other hand, the Government has asked for an increase over 1957–58 of $500,000, bringing the total appropriation for this year to $3.5 million. Of course, it must be remembered that by far the great bulk of these annual sums are expended on the construction and purchase of long-use installations and equipment. Thus the capital invested in civil defense totals many millions of dollars.

The public shelters for which a good part of this money has gone are ordinarily of a type hewn into solid rock. In Oslo, one of the largest underground shelters has a capacity of 4,600 people, and is used in peacetime partly as a garage and partly as a warehouse. In addition to their natural rock protection, these rock shelters are further shielded with a layer of steel and concrete almost a yard thick; affording them a 70 pounds per square inch resistance. The interiors,

which allow about 1 cubic yard of living space per person, are designed to be gastight and are equipped with air ventilators and filters.

It seems clear that the shelter program in Norway is about to receive renewed emphasis as a result of the current reexamination of the overall civil defense program. A special King's Committee charged with this responsibility was established in 1957, with a mandate to report on all aspects of Norwegian civil defense. It was asked to concentrate particularly on the impact of new weapons systems on the country's shelter program. The technical requirements of construction for adequate blast protection will be investigated, and because of the need to protect against increased radiation, there will also be a reexamination of the need for public shelters outside the immediate target areas.

There are indications that, because of these new conditions, the committee will conclude that there are not enough public shelters in Norway. Indeed, reports indicate that Norwegians have recognized for some time that because of shorter warning times, there is a greater risk than before in reliance upon dispersion and evacuation. Hence the feeling has grown among the public that the number of shelters must be considerably increased.

The Netherlands

ORGANIZATION

Postwar civilian defense activity in the Netherlands was begun as early as 1950, and formal organization was resumed officially in 1953, after the passage in 1952 of basic legislation. One law concerns the general organization of civil defense, and deals with the measures to be taken for protecting the civilian population. It outlines the various official bodies which, in addition to the Interior Ministry, are responsible for the program, and contains certain provisions which deal with evacuation. The second law provides for the organization of the Civil Defense Services, and defines the legal status of the civil defense volunteers.

Basically the direction of civil defense in the Netherlands, as in most other European nations, falls under the primary responsibility of the Minister of the Interior. Thus, civil defense is viewed as a problem requiring essentially centralized control and direction. Nevertheless, the mayor of each community is responsible for local civil defense services, and the Queen's commissioner in each of the provinces coordinates these local measures.

PERSONNEL AND COSTS

At the beginning of the postwar program, it was the announced intention of the Government to rely entirely on volunteers, and this goal was given the enthusiastic support of the nonofficial Foundation for the Promotion of the Protection of the Population, a very novel organization. It is a well-organized volunteer movement whose mission it is not only to promote research into advanced civil defense techniques, but primarily to stimulate the interest of the general public

in civil defense. Toward this end the organization is very active in publicity, with a view toward greater recruitment of volunteers.

However, while the level of morale among civil defense workers is very high, it has proven very difficult to attract a sufficient number of people to man the necessary civil defense services. Up to very recently, the Dutch had continued to place their primary reliance on volunteers to man their forces, but the personnel problem has continued to hinder the entire program.

It is notable, for example, that during the first 3 years of the program, from 1953–56, the Government spent more than $205 million for equipment purchases alone. Much of this was aimed at providing the Netherlands with a strong, modern, and alert mobile columns base for civil defense, but it developed that there were too few volunteers to man the equipment. Consequently, the Interior Ministry announced that the 16,000-man strength of the mobile columns would be met by enrolling Air Force draftees into civil defense.

In addition to its early equipment purchases, the Netherlands has appropriated substantial sums annually for the continuing support of civil defense. In 1955–56, for example, the civil defense budget was set at $4.8 million, or 1 percent of the $484.1 million spent on military defense. In recent years this allocation has increased: in 1957 the total was $6,300,000 (1.3 percent of the military budget) and in 1958 civil defense expenditures rose to $7,926,000. The various civil defense services have continued to take the bulk of these appropriations, and they, along with the evacuation planning program have accounted for most of the recent increases.

The problem of attracting sufficient volunteers has continued to be difficult. The Interior Ministry set an overall goal for all civilian defense services at 220,000, but by early 1958 there were only 160,000 men and women on the rolls, with more needed in the fields of fire control, hospital work, and communications. As a final consequence, compulsory service in civilian defense was announced by the Interior Ministry in 1958, under a scheme by which all men over 26 years of age would be required to serve if called up.

Nevertheless, since 1951, 150,000 people have taken courses at the Barneveld Civil Defense Staff College, and 1,000 instructors have been graduated.

PLANNING AND SHELTERS

The basic concept of civilian defense in the Netherlands appears to lay primary emphasis on postattack measures to alleviate the immediate effects of bombing. It is clear, however, that a very energetic scheme has been precluded by an unwillingness to spend, in peacetime, massive sums of money on civil defense,[22] and by the difficulty of raising sufficient volunteers for civil defense services. In the past, the main efforts were directed to setting up a good warning system and preparing an evacuation-dispersal scheme. There is, however, a certain amount of interest in shelter construction, though this is of only very recent expression.

The Hague alone is scheduled to have built, in the busiest parts of the city, a total of 17 shelters. These are to be relatively small, and are designed primarily for people caught in the streets at the time

[22] See The Fifteen Nations, March 1957.

of an attack. Their total capacity would be only a few thousand. In the larger region surrounding The Hague, a total of 73 shelters is programed, also of relatively small design to facilitate rapid entrance. This program, which was begun at the end of 1956, is very new and is a distinctly limited effort. The entire program calls for public shelters (for those caught in the street) to have a capacity of 50,000 and designed to protect against the effects of "nominal" atomic bombs. An additional 50,000 persons are to be accommodated in private shelters built into existing buildings. To date, there is a public shelter capacity for 20,000 of the 50,000 programed.

Most of the shelters which were constructed in the capital were incorporated into the construction of new government buildings,[23] but there is no program to build shelters into existing structures. Neither is there any provision which requires private builders to incorporate shelters into new construction. It must be remembered, of course, that the problem of very sandy soil, and the absence of much rock, makes the problem of deep shelter construction most difficult in the Netherlands.

Despite these limitations, the Dutch have established a standard of energetic participation in civil defense work, which, among the various volunteer civil defense services of Europe, is probably unparalleled for sheer enthusiasm and smooth organization. There were, for example, numerous comments by outside observers on Dutch organizing talent after a mass civil defense exercise in 1955.

Given the title of a "Manifestation," this national exercise brought together, as the result of competitive activities, volunteer groups and teams from all over the country. This particular demonstration, which was attended by the highest officials of the Government, particularly impressed both NATO and American observers for what it indicated about industrial civil defense in the Netherlands. Many firms support their own fire trucks and rescue teams, and in a most realistic demonstration, which included fires, debris, and simulated casualties, over a thousand members of industrial civil defense teams took part. The American Observer reported that "the organization and efficiency with which they carried out their tasks and demonstrated their proficiency was tremendously impressive." [23a] Sir John Hodsoll, who attended for NATO, was no less impressed with the efficient demonstration, but there are indications that he was less inclined to be satisfied that such an event demonstrated a great deal about the country's real ability to survive the scale of attack which must be planned for in the nuclear age.[24]

It seems only reasonable to conclude that the Dutch effort in civil defense, while of course both proportionately and absolutely on a smaller scale than the British program, is basically similar in orientation. It is based on post-attack help and rescue, and is largely confined to firefighting. It does not seem well synchronized with what is known of the blast, heat-flash, and radiation effects even of fission weapons.

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[23] This information was given to the author by officials at the Netherlands Embassy in December 1958.

[23a] Howard, Mrs. Katherine G., Civil Defender, Special Industrial Issue, June 1956.

[24] Hodsoll, Sir John, in NATO Civil Defense Bulletin, August 1955, p. 8.

Belgium

Civil defense in Belgium is still governed by an old law of 1937, under which the King can take, in peacetime, all measures necessary to ensure the protection of the civilian population. A considerable civilian defense establishment has operated under authority of this law in the postwar period, and there was a reorganization of the civil defense services as recently as April 1958. The need for new legislation is recognized, however, and it is expected that a recently prepared bill will soon be put before the Parliament.

Although guidelines for civil defense training are set by the Minister of the Interior, most responsibility in Belgium appears to rest with local authorities. Training of civil defense volunteers, however, is according to a centrally set pattern, and is taken very seriously. There is a national civil defense school at Florival, which is staffed primarily by British-trained Belgian instructors. Accordingly, the instruction is along British lines, and is widely known and respected for its realism and practicality; particularly insofar as it deals with techniques for rescue, fire, and damage control. The goal of this training is to build a corps of workers who are intimately familiar with the whole range of postattack procedures.

The various postattack civil defense services are responsible for the great bulk of the entire civil defense budget, which in recent years has begun to increase significantly. In 1957 total budget allocations were $2,413,000, and in 1958 the sum was $3,428,000. This is roughly six-tenths of 1 percent of recent military budgets.

There are recent indications that Belgium plans to embark on a sizable shelter program. The building program calls for reinforced shelters with a capacity of 500,000 in the most likely "atomic target" areas. Blast shelters designed to give protection in areas expected to sustain only conventional bombings are programed for a capacity of 400,000 persons. In addition, there are plans to encourage the construction of home shelters for almost 3 million persons. To date, construction has been completed to the point where 45,000 persons can be accommodated in "atomic target" areas, and home shelters in such areas now have a capacity of 25,000 persons.

Italy

There is at present no civil defense law in Italy, and no formal civil defense organization. Legislation has, however, been prepared in the Ministry of the Interior, and was presented to Parliament late in 1956. The Government seeks to establish a "General Directorate" for civil defense, to be organized within the Interior Ministry. Its function would be the organization of a national program for civilian defense, but no action has yet been taken on the proposal.

There has been some planning for the future, and it is foreseen that any future civil defense services will be organized around the present Firefighting Division of the Interior Ministry, the body which is presently responsible for civil defense planning.

Without authority of law, there can be no specific budget allocations for civil defense, but appropriations to the firefighting division, which would be later useful for civil defense services, have for the past 2

years been set at $1,607,000 annually. In addition, in 1957 a very small sum was allocated for warning systems. No information is available, either from Rome or NATO Civil Defense Headquarters, with regard to Italian plans for shelter construction. It is known, however, that Italy has maintained, though in need of repair and equipment, a total of 600 shelters, with a reported capacity of 500,000 persons.

TWO NEUTRALS: SWEDEN AND SWITZERLAND

Sweden

Sweden, since she is not a member of any military alliance, ostensibly has less reason to fear nuclear attack than other European nations. Nevertheless, the country is heavily industrialized and thus offers several suitable targets for nuclear bombing; this factor, in addition to the Swedes' well-established desire to preserve their neutrality by making aggression "too expensive," has impelled them to invest heavily in a program of civil defense.

No doubt their readiness to take this step is connected with the broader outlines of Swedish defense policy: To concede that while Sweden cannot stop an aggressive superpower, she can take measures which will vastly increase the cost of aggression. It was recently observed that Sweden's goal must be to force an aggressor to use such large forces and take so long to conquer the country, that the gains simply would not be commensurate to the costs.[25] As part of this program, Sweden embarked on a program of shelter construction earlier and more intensively than any other country and the result is a product in advance of all other nations.

SCALE OF THE PROGRAM

As important as time, is the amount of money Sweden spends on civil defense. In some years, the total outlay for civilian defense has been as high as $28 million annually. Generally the figure is equal to 2 percent of the country's total annual expenditures on all military defense, and puts Sweden, along with Switzerland and Denmark, at the top of the budgetary list. In terms of relative burden per head of population, however, the figure is even more significant, for every Swede supports civil defense at the rate of about $4 per year per person. The comparable American figure is about $0.235. Even considering only absolute figures, the sum spent by Sweden per person has been as much as 13 times greater than the American expenditure per person.

The organized civil defense program dates from 1944, but only in recent years, say since 1950, has there been the large-scale public interest which helps explain the postwar progress of the program. The basic law of 1944 required all Swedes, ages 16 to 65, men and women, to register for civil defense duties. But this provision has effectively been implemented only in recent years, and with regard to women, it has been of real significance only since 1955.

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[25] The U.S. Naval Institute Proceedings, "Sweden's Defense Problem," by Rodger L. Simons, November 1958, p. 63.

The two organizations on which Swedish civil defense is based are the general Civil Defense Service, whose responsibility is community protection as a whole, and a special organization for home and industrial civil defense. An extensive and long-term reorganization of all Swedish civil defense services is now being considered, and it is likely that while the total number of individuals now enrolled will in the future be reduced, their work will be reorganized on more modern lines. The new program also calls for purchase of the most recent equipment, and the continuation of the shelter program. It promises to make Sweden an even "harder" target. Under the plan, the Central Government will spend, over a 10-year period, a total of $147 million, of which $40 million will be earmarked for new equipment, and an equal amount set aside for new shelter construction.

THE SHELTER PROGRAM

Shelters have been that facet of the Swedish effort which has attracted the widest attention. Apparently the country decided very early in the postwar period to put the main civil defense emphasis on shelters, rather than upon evacuation and dispersal. The older policy, which called for evacuation of most larger cities, is now regarded as unrealistic, whereas present plans envisage evacuation only of the least necessary people in only the largest cities.

The shelter program is designed to give protection not only to especially vulnerable population centers, but to certain segments of industry as well. Nevertheless, the population shelters have attracted the widest attention, and with good reason. Rock or concrete shelters, designed to give protection against high altitude detonation of an H-bomb, even straight overhead, are being built in the central parts of all Swedish cities with a peacetime population of more than 50,000. In case of surface detonation, or a low-altitude explosion, these shelters offer "acceptable protection at a distance of 1 or 2 miles from the point of detonation, depending on the size of the H-bomb." [26] Fifteen such shelters have been, or are being completed, with an overall capacity for 100,000 persons. Simple arithmetic indicates that these are very large-size shelters, and the very famous "rock garage" in the center of Stockholm may be taken as a good example of the type.

Built into a mountain, with a granite roof 50 to 65 feet thick, this shelter took 3½ years to complete, and cost $1.6 million. It has a seating capacity of 10,000, and that number of people can enter the shelter in a time lapse of only 4 minutes. A good quantity of air is available under "clean" outside conditions, but even under gas attack, or necessary radiation filtering, there will be sufficient air to sustain the population of the shelter for a period up to 10 hours.[27] Similarly, since the entire structure is hermetically sealed, even intense fires outside will not prevent inside temperature from being reasonably controlled.

Its popular name, the "Rock Garage," is derived from its peacetime use as an automobile garage. Under this type of scheme, the cost is shared evenly between the city of Stockholm, the central Government,

[26] Speech by Mr. Nils Montan, Counselor, Swedish Embassy, at a meeting of a subcommittee of the National Association of Manufacturers, June 12, 1957, in Washington.
[27] Winship, Stephen, "Sweden Goes Underground," This Week, Jan. 17, 1954, p. 26.

and the private garage firm. A similar shelter is presently under construction in another part of Stockholm, with a capacity of 15,000 persons, and it has similar protective characteristics. The total cost for these two structures is about $4,250,000, and "they are expected to resist everything except a direct hit by a hydrogen bomb."

INDUSTRIAL CIVIL DEFENSE

Like the overall program for civil defense, Sweden's industrial protection scheme is also of relatively ancient vintage. It is concentrated on industries vital in wartime, and was begun in 1945. An aircraft factory, and several ordnance works, as well as some plants which produce precision instruments have been built into very large underground installations. These factories have ceilings 12 feet high, and 50 to 80 feet thick. Like the population rock shelters, they are expected to resist everything except a direct hit by an H-bomb.

The cost factor of these plants is perhaps their most interesting aspect, since in some cases it is only slightly higher than for a comparable factory above ground. In other cases, "the cost is an estimated 25 percent higher. On the other hand, maintenance and heating and insurance are less expensive for underground plants." [28]

These few illustrations help to explain why Sweden is the envy of civil defense workers throughout the world. While no doubt there are drawbacks to the Swedish program (the extremely large size of the population shelters is regarded as dangerous by some critics, and until now the absence of a central civil defense school was seen as a training failure by others), the existence of the shelters, along with the presence of 1 million trained volunteers in a country of only 7 million persons, indicates that if an attack should come, the Swedish people may have a better chance of survival than those of other nations.

SWITZERLAND

Switzerland, like Sweden, is not a member of any military alliance, and like the Swedes, the people of Switzerland regard civil defense with the utmost seriousness. The Swiss spend on civil defense a higher proportionate amount, in comparison with their own military budget, than almost any other country: 2.5 percent. Clearly, this is done with the consent and willing support of the country's leading soldiers; indeed, the Chief of Staff was reported to have said that civil defense should be given the status of a fourth service.[29]

Late in 1955 the Swiss Government enacted into law a bill reestablishing civil defense, and providing for compulsory civil defense service. Under its provisions, all males between the ages of 15 and 65 will be required to serve from 3 to 6 days each year, and women, whose service is not compulsory, may nonetheless volunteer for service. It is expected that under this scheme a force of 800,000, or 15 percent of the total population, will be established.

In addition, any organization with a staff of more than 50, such as a factory or other establishment, must by law organize defense teams. Another provision of the same legislation requires all com-

[28] Montan speech, op. cit.
[29] Civil Defender, November 1955.

munities of more than 1,000 persons to organize a local civil defense organization.[30]

Of course, Switzerland's interest in civil defense is not new. At the same time that this legislation was passed, the country already had some 33,000 old shelters, with a capacity for 650,000 persons. Many of these structures will continue to be useful, as will the many underground first-aid stations and the already existing organization for industrial civil defense and firefighting.

The new program is ambitious. Its emphasis, true to Swiss experience, will be on shelters, and the Central Government alone plans to spend, during the next several years, a total of $14 million on civil defense. The target is to provide shelter space for approximately 2 million people by 1963, while present capacity is almost 900,000. The governments of the Cantons are themselves undertaking to construct shelters for their urban populations. In Baden, for example, one large shelter is under construction, with a capacity of 3,000 people. Its cost is almost $750,000, with 20 percent of that sum borne by the Federal Government, and it is hoped that by using the shelter as a peacetime garage it will help to pay for itself.

When the Swiss program is complete, the combination of shelters and trained workers in civil defense should assure the population a very high degree of protection. The Swiss civil defense effort is fully consistent with her tradition of neutrality, and is part of a military policy designed frankly to exact a high price from an aggressor. Without a "hard" homeland as its base, however, such a course would be litle more than a brave bluff. With an adequate program of nonmilitary defense, this policy becomes meaningful.

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[30] Washington Post, Dec. 1, 1955.

PART III—CIVIL DEFENSE IN THE SOVIET UNION

Deductions concerning the Soviet civil defense program and its progress must necessarily be tentative, since most of the data available is derived from strictly censored Soviet publications. Still, such material as the Soviets do publish can be used with profit in studying Soviet civil defense. As an American writer has noted in connection with Soviet military doctrine as a whole, "the main point is that the Soviets simply cannot afford to mislead their own officer corps" by printing incorrect information "merely in order to try to mislead us."[1]

SOVIET CIVIL DEFENSE DOCTRINE AND ITS DEVELOPMENT

It may be convenient to distinguish three basic stages in Soviet civil defense doctrine, each characterized by the weapons against which the defense plans were oriented. The first began in the early years of Soviet rule, the second in 1951, and the third in 1954. (Limited revisions took place at various times, the latest being early in 1958.) The successive earlier stages have strongly influenced present-day Soviet civil defense thinking and help to explain the nature of current Soviet practices.

To 1931

The first stage of Soviet civil defense doctrine was characterized by preoccupation with poison gas and other toxic substances. Thus, a 1923 article in a Soviet military magazine stated:

> Today no one has any further doubt that our potential enemy will use chemical weapons in addition to other means of waging war. * * * Since a strategic aim in a future war will be the * * * destruction of the national centers providing supplies for the * * * army, the air fleet will be used for the bombing of cities, factories, railroad centers, etc., with *chemical* bombs.[2]

Accordingly, gas masks were manufactured by the Soviets and used in training the population.[3] Even masks for horses were under consideration.[4] Shelters were thought of in terms of safety from gas attack; proposals for the hermetic sealing of stair wells or basements to provide protection against poison gas were discussed in the Soviet press,[5] while explosive bombs received little attention.

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[1] Garthoff, Raymond L. Soviet strategy in the nuclear age. New York, Frederick A. Praeger, 1958, p. 272.
[2] Voennyi vestnik, 1923, No. 17, p. 33. [Italics in the original.]
[3] Tekhnika i snabzhenie Krasnoi Armii, 1925, No. 181, p. 9.
[4] Ibid., 1925, No. 188, pp. 7–17. (Gas masks for cattle remain a feature of Soviet civil defense planning today. Cf. Voennye znaniia, 1958, No. 7, p. 21.)
[5] Tekhnika i snabzhenie Krasnoi Armii. 1925, No. 181, pp. 1 and 10.

This orientation was not without its justification in the military technology of the time. Poison gas had been used in military operations in World War I. As early as 1919, the Soviets themselves had established an institute for training chemical warfare officers, as well as for research work on poison gases.[6] German and Soviet officers cooperated in gas experiments in the mid-1920's.[7] The Red army is reported to have been ready to launch gas attacks in certain military operations in 1920 and 1921, though the orders were later countermanded. The Soviets are said to have actually used poison gas in suppressing an uprising in the Caucasus in the late 1920's, as well as against tribesmen in central Asia some years later.[8]

Thus, concern over chemical attack became an integral part of Soviet civil defense thinking, and has continued to occupy a prominent position to the present time.

1931–54

In 1931, in view of developments in military aviation, the Soviets found it necessary to add protection against incendiary and explosive bombs to chemical defense.[9] Incendiary bombs were at first regarded as the chief menace; as late as 1936, the civil defense training course discussed explosive bombs only briefly, and still visualized air-raid shelters as rooms in private dwellings hermetically sealed against poison gas.[10] The wars in China and Spain brought explosive bombs to the fore, though it was not until 1940 that extensive construction of bomb-proof shelters began even in Moscow.[11]

Soviet civil defense had a lower priority than other military preparations. This was perhaps due to the nature of Soviet military doctrine in general, which, according to an American writer, was characterized by "excessive preoccupation with the offensive * * * and, corollarily, insufficient planning for defense." [12]

K. E. Voroshilov, head of the Red army, admitted as late as 1939 that Soviet civil defense preparations were unsatisfactory. He said:

> I shall not go into the problem * * * of local or civil air defense, although this problem is so important that I should really say everything about it that should be said. I limit myself to saying that matters in this field are, regrettably, rather bad, and not so much because of the fault of our personnel (i.e., the military) as of the civilian workers. This matter must be taken up in real earnest and without delay.[13]

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[6] Ibid., 1925, No. 181, p. 1.
[7] Gatzke, Hans W., Russo-German military cooperation during the Weimar Republic. In: American Historical Review, vol. 58, No. 3, April 1958, pp. 578, 586.
[8] Pozdnyakov, V., in: B. H. Liddell Hart, The Soviet Army. London [1956], pp. 384–385.
[9] This change in planning was shown in a reorganization at the end of January 1931, within the Osoaviakhim, the paramilitary organization then providing military training to the civil population. Its sector of military chemical defense (Sektor voenno-khimicheskoi oborony) was reorganized into the sector of air defense (Sektor protivovozdushnoi oborony) with the added responsibility of defense against bombs. (Aviatsiia i khimiia, 1931, No. 4–5, p. 35.)
[10] Tramm, B. Normy "Gotov k PVKhO I i II stupeni." Moscow, 1936, pp. 5–8.
[11] Za oboronu, 1946, No. 23–24, p. 10.
[12] Garthoff, Raymond L. Soviet Military Doctrine. Glencoe, Ill. [c1953], p. 436.
[13] Izvestiia, Mar. 15, 1939, p. 2.

There is ample evidence from Soviet sources that the air defense system was still unprepared when the Soviet Union found itself at war,[14] and some features of prewar plans were later evaluated by Soviet commentators as being "naive."[15]

Nazi Germany's attack against the U.S.S.R. in June 1941, suddenly made civil defense urgent. In the first few hours of hostilities, the cities of Zhitomir, Kiev, Sevastopol, and Kaunas were bombed.[16] Frantic measures were then undertaken to bring the air defenses into readiness, and orders went out to train the entire population of the country in civil defense.[17] The orientation of Soviet civil defense continued to be twofold, against bombs and against chemical attack, even though the latter was not used during the war.

With the defeat of Germany and Japan in 1945, popular interest in civil defense sharply declined. A Soviet writer noted, in April 1947, that in this field:

> Recently, a certain slackening has been noted. * * * Many * * * groups have discontinued their systematic training and have given up studying. * * * One frequently now hears discussions on the "dullness" of civil defense training.[18]

However, Soviet officials insisted that the civil defense system be maintained and stated that they would not tolerate its falling apart.[19]

The civil defense training courses remained conservative, with few changes from the program taught in 1941.[20] The word "atomic" did not appear once in a civil defense manual published as late as September 1953.[21]

Since 1954

In 1954, Soviet civil defense entered a third phase with the incorporation of defense against atomic warfare. This move was related to the integration of atomic weapons into Soviet military doctrine as a whole, which took place following Stalin's death. As Raymond L. Garthoff writes:

> The Soviet army was tardy in facing the challenge of preparation for nuclear warfare. Under the influence of "Stalinist stagnation" in military doctrine, incredible though it seems, there was literally *no preparation for atomic warfare* prior to the autumn of 1953.[22]

Once the policy was revised, the Soviet authorities undertook an extensive program to adapt civil defense to the atomic era. As far as can be determined, the first public indication of the new orientation was the publication, in the second half of 1954, of a pamphlet presenting basic data on the atomic bomb and defense against it.[23] Now at

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[14] E.g., Za oboronu, 1947, No. 4, p. 21.
[15] Ibid., 1945, No. 23–24, pp. 13–14.
[16] Izvestiia, June 23, 1941, p. 1.
[17] Ibid., July 2, 1941, p. 1.
[18] Za oboronu, 1947, No. 6, p. 1.
[19] Ibid.
[20] Cf. the 1953 course summarized in table 1, p. 97.
[21] Savitskii, I. I., and P. M. Kirillov. Protypovitriana oborona. Kiev, 1953. 214 pp. (In Ukrainian, translated from the Russian.)
[22] Garthoff, Raymond L. Soviet Strategy in the Nuclear Age. New York, [c1958], p. 156. [Italics as in the original.]
[23] Ezhegodnik knigi, 1954, pt. 2, No. 11829. (Pamiatka naseleniiu po zashchite ot atomnogo orudhiia. Moscow, 1954. 32 pp.)

last, as an American author comments, "the Soviet public was permitted to see a picture of the mushroom cloud which in the West had been a symbol of the nuclear age for nearly a decade." [24] The pamphlet was distributed free to the population by the Soviet Main Administration of the Civil Defense Service; it went through three basic Russian editions, was reprinted in provincial cities, and was translated into many Soviet minority languages.

Other mass information media at the Soviet Government's disposal were called into play to make every Soviet citizen familiar with the basic facts of defense against atomic attack. Numerous articles appeared in magazines and newspapers, radio programs were presented, posters were displayed, lectures were given by the national lecture society and other agencies, and, later, motion pictures on atomic bombs were released.

In the summer of 1955, a vast formal program was undertaken to train the entire Soviet population in the fundamentals of atomic defense. A 10-hour course was worked out, providing general information on the atomic bomb, its effects, and the methods of protection against it; it also provided some first-aid training and data on air-raid signals. The entire adult population of the Soviet Union was called upon to complete the course by the end of 1956; if Soviet claims are to be accepted, 85.5 percent of the people did so. In connection with the course, new civil defense textbooks were published, adding to the older material considerable data on atomic weapons.[25]

The Soviet line of reasoning at the time seems to have been that "the mental disturbances that nuclear attacks can produce in millions of people * * * will be more pronounced among the people of capitalist countries than among people 'with full political awareness,'" e.g., the Soviet people.[25a]

In 1958, a second course, over twice the length of the first, was launched and again taught to the population on a compulsory basis. This program included training with gas masks in the presence of real poison gas. Presentation of this course is now coming to a close, but a third course, emphasizing practical training, has already been started, and a fourth course will apparently be undertaken during 1959 or 1960. A program for school children will also begin in the fall of this year. The scope and intensity of this mass training program probably means that more people have learned the fundamentals of civil defense in the Soviet Union than in any other country.

Apparently some time in 1955,[26] a fourth element—biological warfare—was added to the civil defense training program. This phase was also lacking previously, although as long ago as 1938 K. E. Voroshilov had admitted that the Soviet army was conducting research in germ warfare.[27] The unfounded accusations by the Soviet bloc that the United States had employed such methods in the Korean war may reflect active Soviet interest in this type of warfare.

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[24] Kissinger, Henry A., op. cit., p. 369.
[25] More complete data on the courses are given at p. 96 ff.
[25a] Cf. Dinerstein, H. S. War and the Soviet Union. New York, 1959, p. 244.
[26] No 1954 publication describing defense measures against biological warfare has been located. The following book, approved for printing on Jan. 5, 1956, does describe such measures: Dobrovol'noe obsichestvo sodeistviia armii, aviatsii i flotu. Uchebnoe posobie po MPVO. Moscow, 1956, 222 pp. (This Teaching Aid on Civil Defense will be cited hereafter as "DOSAAF, op. cit." The titles of other publications of this organization will be given in full.)
[27] New York Times, Feb. 23, 1938, p. 14, col. 2.

In addition to the mass training program on atomic and biological warfare, the Soviet Government also undertook to make modifications in its civil defense system. The changes consisted primarily of adding defense measures against atomic and biological weapons to the other functions of the civil defense personnel. Thus, the use of Geiger counters to detect radioactive fallout became a responsibility of existing city civil defense staffs.[28]

However, the basic organization and many other features of Soviet civil defense remained unchanged. Measures did not include evacuation from cities (though this was to be added in limited form later). The shelters and trenches already prescribed (with little change from pre-war designs) were regarded as adequate for the atomic age; in particular, it was noted that they would absorbe most initial radiation.[29] No provision appears to have been made for the construction of shelters deep enough to resist direct hits by atomic bombs. Masks designed against poison gas were also found adequate to filter out radioactive dust,[30] and the same was determined concerning filtration equipment in shelters.[31] Evacuation procedures from zones contaminated by radioactive fallout were similar to those previously prescribed for chemical attack.[32]

Though Soviet civil defense now had a fourfold orientation (against conventional and atomic bombs, and against chemical and biological attack) there still appeared to be an important element missing; no provisions were included which were specifically designed against thermonuclear weapons. For example, the standard Soviet civil defense training manual, published early in 1956, while including a brief description of the hydrogen bomb in the introductory section, thereafter limited the discussion to atomic bombs only.[33] This feature of the Soviet plans has been noted in an American source in the following terms:

> * * * the specifics of the Soviet program seem more appropriate to the small-yield fission weapons than to large-yield thermonuclear weapons.[34]

Revisions of 1958

In view of the above, it may be significant that some modifications took place in Soviet civil defense plans in the early part of 1958.[35] The fact that such a revision has taken place has not yet been formally announced—a reticence not unusual in the U.S.S.R.—and the complete picture of the changes decided upon is still veiled in secrecy.

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[28] DOSAAF, op. cit., p. 39.
[29] Ibid., p. 27.
[30] Ibid., p. 91.
[31] Ibid., p. 67.
[32] Cf. Savitskii, I. I., and P. M. Kirillov, op. cit., pp. 146–148, and DOSAAF. Pamiatka naseleniiu po zashchite ot atomnogo, khimicheskogo i bakteriologicheskogo oruzhiia. Moscow, 1957, pp. 43–44.
[33] DOSAAF. Uchebnoe posobie po MPVO. Moscow, 1956, pp. 31–32.
[34] Rand Corp. Report on a Study of Non-Military Defense. [Santa Monica, 1958], p. 40.
[35] The first indications found of the new policy are given in the description of two new civil-defense services in cities (cf. p. 52 ff.), i.e., the "Transportation Service" and the "Food and Trade Service," described in a book published in June 1958 (Gvozdev, M., and V. IAkovkin, Atomnoe oruzhie i protivoatomnaia zashchita, 2d ed., rev. and enl. Moscow, 1958, p. 159). No mention of these changes appears in a book published in April 1958 (Levin, M. E., and others, Zashchita ot sredstv massovogo porazheniia, Moscow, 1958).

However, several incidental statements appearing in Soviet publications within the last few months have made it possible to reconstruct at least some features of the new plans.

One important element announced was that of the evacuation of part of the population of large cities in the event of threat of aerial attack; previous plans had provided that the urban population was to remain where it was. However, the people to be evacuated are apparently to be limited to certain groups, such as children, aged persons, and invalids; most others are still to stay in the cities. The evacuees are to be taken to the country in vehicles supplied by the city civil defense organization, and the village authorities are required to provide them with food and shelter, and, when possible, to put them to useful work.[36]

Why the Soviets plan to have the working force remain in the cities may be explained in their description of the aims of civil defense measures taken in factories and other installations:

> The purpose of such measures is to prepare the installations for operation under conditions of air attack.[37]

This statement also implies that Soviet policy does not contemplate a substantial evacuation of production facilities and equipment from cities.

A second revision made in 1958 seems to be a result of the realization of the devastating effects of contemporary military weapons. Accordingly, special units were then set up in the civil defense organization to provide food, shelter, and other necessities for large groups of people made homeless in case of attack.[38]

Information on other revisions is not as clear cut. Of possible significance may be the greater emphasis shown in recent Soviet publications on civil defense outside of large cities. Thus, in November 1958, recommendations were published concerning the construction of shelters, primarily against blast, in outlying suburbs,[39] and a book devoted specifically to civil defense in rural areas is scheduled for publication early in 1959.[40]

Finally, the Soviets have recently been giving increased attention to measures to be taken in the event of a sudden outbreak of hostilities. Previously, a number of time-consuming civil defense measures were not to be undertaken until the Government announced an alert. (Cf. p. 78 ff.) However, several 1958 Soviet publications have stated that warning in case of air attack might be very short. Thus, one such book says:

> Present-day bombers capable of carrying atomic bombs have great speed and effective range, which considerably reduces the time required for the delivery of the atomic bombs

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[36] Cf. p. 81 ff. (This program closely resembles that of Germany, for example, during World War II, where children and older persons in large cities subject to air attack were evacuated to safer zones; later, other individuals not needed in the cities were also removed. Cf. Hempe, Erich, Strategie der zivilen Verteidigung, Frankfurt a. M., 1956, p. 33. In the U.S.S.R., a partial evacuation of children from Moscow took place shortly after the Soviet Union entered the war in 1941. Cf. Bourke-White, Margaret. Shooting the Russian War. New York, 1942, p. 64; cf. also p. 81.)

[37] Levin, M. E., and others, op. cit. (footnote 35), p. 108.

[38] Cf. p. 54.

[39] Voennye znaniia, 1958, No. 11, pp. 26–27.

[40] MPVO v sel'skoi mestnosti. (Civil defense in the country.) Cf. Sovetskii patriot, Jan. 11, 1959, p. 2. (For some indications on the progress of civil defense preparations in rural areas, cf. p. 92.)

> upon the target. An atomic attack may take place immediately after the announcement of the alert. Under these conditions, there would be little time to put the civil defense system into operation.[41]

In the words of another author:

> The amount of time * * * after the alarm signal will be very limited, and possibly will not exceed 15 to 20 minutes.[42]

Accordingly, instructions have recently been provided to cover certain situations in case of bombardment without warning.[43] Measures which can be taken in advance are now classed separately in civil defense publications,[44] and emphasis appears to be increasing on having the more laborious work involved in civil defense preparations carried out in peacetime.[45]

ORGANIZATION OF SOVIET CIVIL DEFENSE

The Civil Defense Network

The Soviet civil defense system[46] is headed by the U.S.S.R. Ministry of Internal Affairs (usually referred to by its Russian initials, MVD), the agency which formerly had jurisdiction over the Soviet secret police and is still in charge of corrective labor camps. Among its other functions, this Ministry still has authority over the regular police and fire departments throughout the country, a feature which would facilitate their coordination with civil defense workers in case of attack.

The Soviet civil defense system is separate from the antiaircraft forces of the Soviet Army,[47] the function of which is to defend the country from aircraft and other means of aerial attack, and which embrace "units operating fighter aircraft, antiaircraft artillery, various types of antiaircraft weapons, searchlights, balloon barrages, and radio equipment."[48]

The civil defense system is also separate from, but works closely with, a paramilitary organization, the DOSAAF (Volunteer Society for Assistance to the Army, Air Force, and Navy), the primary task of which is the training of the civilian population in skills having a military application, and which is carrying out the mass civil defense education program.[49]

The Soviet civil defense organization has a relatively small full-time staff, and is built on the principle of making the fullest use of personnel and equipment in nonmilitary organizations—such as local governments, industrial plants, railroads, and so forth. The heads of industrial and other establishments are automatically the commanders

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[41] Gvozdev, M., and V. IAkovkin, op. cit. (footnote 35), p. 165.
[42] Voennye znaniia, 1958, No. 11, p. 24.
[43] Gvozdev, M., and V. IAkovkin, op. cit., p. 182, 186.
[44] Ibid., p. 154.
[45] Ibid., p. 155.
[46] In Russian, usually called "MPVO," the abbreviation of Mestnaia protivovozdushnaia oborona (literally, "local antiair defense"). The last Russian word has also been given in Soviet sources as "okhrana," meaning "protection."
[47] Voiska PVO strany. (Cf. Letopis' zhurnal'nykh statei, 1958, No. 43147.)
[48] Bol'shaia sovetskaia entsiklopediia. 2d ed., Moscow, 1957, vol. 50, p. 428.
[49] Cf. p. 96 ff.

of civil defense for their organizations. Thus, in peacetime, the civil defense system is chiefly a sort of shadow organization based on already existing units; in case of necessity, the mere issuance of an order would, in theory at least, convert the potential system into a real one.

The number of persons participating in the civil defense organization is kept secret. During World War II, 5,500,000 citizens are reported to have taken part in civil defense operations under enemy attack.[50]

National Organization

The official within the Ministry of Internal Affairs in charge of civil defense has the title: First Vice Minister of Internal Affairs for Civil Defense (Pervyi zamestitel' Ministra vnutrennikh del po MPVO).[51] Early in 1958, this post was held by Oleg Viktorovich Tolstikov,[52] whose title (in 1957) was Lieutenant General of Aviation.[53]

There also exists the post of civil defense chief of the U.S.S.R. (Nachal'nik MPVO Soiuza SSR);[54] if the same pattern was followed here as in other Soviet defense agencies, this post was also held by Tolstikov.[55]

The National Civil Defense Chief operates through a staff, called the National Civil Defense Staff (Shtab MPVO strany),[56] headed by the Chief of the National Civil Defense Staff (Nachal'nik shtaba MPVO strany).[57 58]

The MVD personnel of the civil defense organization, both nationally and locally, is militarized. The higher positions are held by officers, with ranks similar to those in the army or secret police. Thus, in the early postwar period, the city civil defense chiefs in Moscow and Leningrad were a lieutenant general and a major general, respectively.[59]

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[50] Za oboronu, 1946, No. 15, p. 21. (Some Western estimates have given the number of Soviet civil defense workers as about 20 million; this, however, appears to refer to the membership of the DOSAAF.)

[51] Voennye znaniia, 1958, No. 6, p. 18. (There are several Vice Ministers of Internal Affairs, each of whom is in charge of a segment of the Ministry's operations. The more important of these have the title "First Vice Minister.")

[52] Sovetskii patriot, Feb. 11, 1958, p. 1, and Feb. 12, 1958, p. 2. (Here the word "First" is omitted from his title.) Tolstikov was born in 1905 and rose from the ranks in the Red army. During World War II, he commanded the 47th Aviation Division. He graduated from the Voroshilov Military Academy in 1951, and in 1954 held a high command in the Caucasus; he was also a member of the Central Committee of the Azerbaijan Communist Party. (Cf. Bakinskii rabochii, Feb. 19, 1954, p. 1; Feb. 24, 1954, p. 3; Vestnik vozdushnogo flota, 1957, No. 1.)

[53] Sovetskaia aviatsiia, Jan. 24, 1957, p. 4.

[54] Voennye znaniia, 1956, No. 6, p. 18.

[55] This supposition is supported by the order in which the titles of officials authorized to award a certain medal was given in a Soviet journal (Voennye znaniia, 1958, No. 6, p. 18): "Civil Defense Chief of the U.S.S.R., First Vice Minister of Internal Affairs for Civil Defense, Chief of the National Civil Defense Staff. * * *" If the two positions were held by different persons, the order would doubtless have been reversed.

[56] Voennye znaniia, 1958, No. 6, p. 18.

[57] Ibid.

[58] As far as can be determined from scattered references in Soviet sources, the staff was formerly subordinate to the MVD's Main Administration of the Civil Defense Service (Glavnoe upravlenie sluzhby mestnoi protivovozdushnoi oborony; the word "sluzhby" ("service") was not added until 1953 or 1954). This agency was established in 1939 or 1940, and appears to have taken over the civil defense organization and personnel from the Army in July 1941, shortly after the Soviet Union entered the war. However, no clear-cut reference to this agency has been located in the Soviet press since 1955, and pending further information it is here assumed that the administration was abolished in that year and its functions absorbed by the National Civil Defense Staff.

[59] Za oboronu, 1946, No. 2, p. 16; No. 23–24, p. 10.

The organization operates under regulations applicable to the Soviet Armed Forces as a whole,[60] and is closely tied to the Soviet Air Force; as noted above, the system in 1958 was headed by an air force general.

Organization Below the National Level

Below the Central Government, the civil defense administration is organized in a hierarchy based on the territorial principle—first by the 15 Republics composing the Soviet Union, then by the Provinces [61] into which the Republic are divided, and then by cities.

At each step in this hierarchy, there is an intricate relationship between the MVD officers and the local government officials of the areas concerned, involving interlocking positions, division of responsibility, and the ever-present "control." [62] A diagram showing the system, as described in available sources, is given as chart 1.

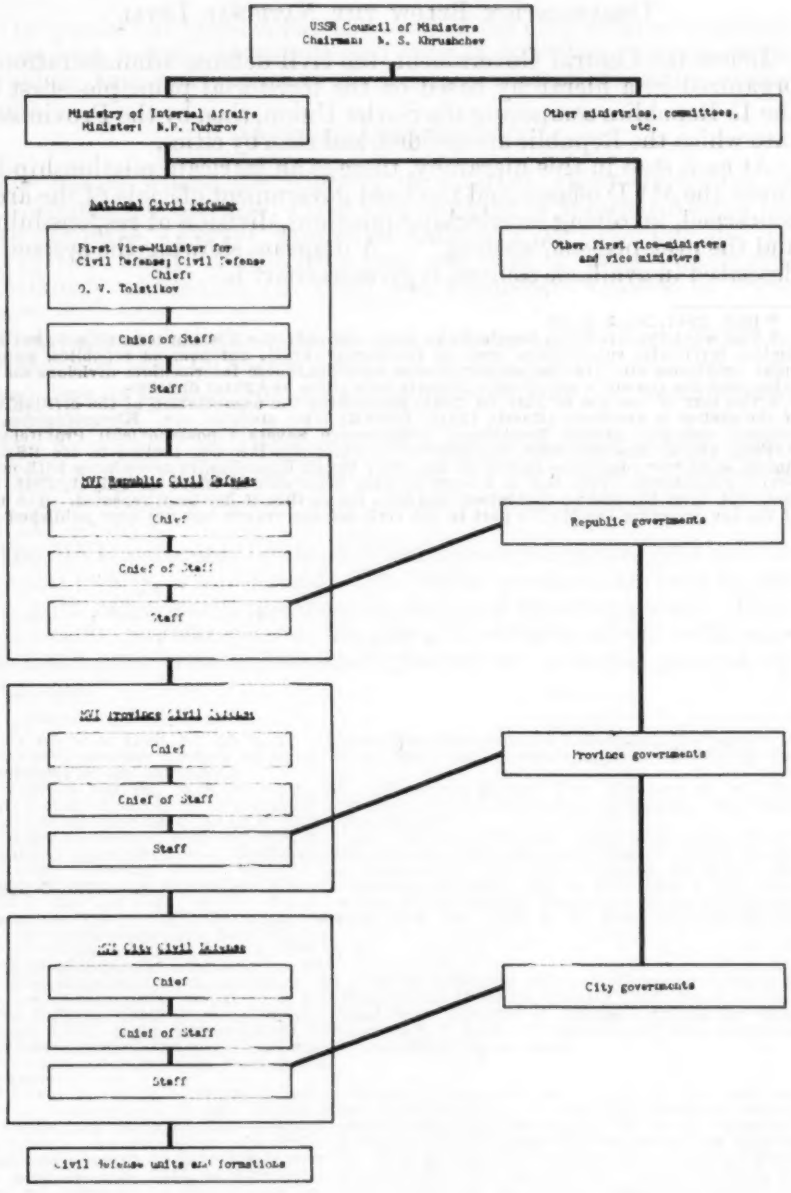
[60] Ibid., 1947, No. 3, p. 18.

[61] The word "province" is here used to cover not only the Russian term oblast', but also similar territorial subdivisions such as territories (krai), autonomous republics, autonomous provinces, etc. In the smaller Union republics, these intermediate divisions do not exist, and the republics are divided directly into cities and rural districts.

[62] The text of the law of July 10, 1941, prescribing the organization of the civilian side of the system is available (Russia (1917- RSFSR) laws, statutes, etc. Khronologicheskoe sobranie zakonov, ukazov Prezidiuma Verkhovnogo Soveta i postanovlenii Pravitel'stva RSFSR, vol. 4, Moscow, 1949, pp. 336–337); while this law was limited to the RSFSR, similar laws were doubtless passed in the other Union Republics, in accordance with usual Soviet procedures. This law is known to have been still in effect on July 1, 1948 (cf. ibid., vol. 1, p. 3), and no indication has been found that it has been repealed. The text of the law covering the MVD's part in the civil defense system has not been published.

CHART ONE

GENERAL ORGANIZATION OF THE SOVIET CIVIL DEFENSE SYSTEM



Sources: Various; cf. text.

Responsibilities are shared on the basis that the civilian authorities handle preparations for civil defense (recruiting of civilians into civil defense units, their training, the construction of shelters, etc.),[63] but that operations under enemy attack are in charge of MVD officers. The civilian local goverments in preparing for civil defense must function in accordance with directives sent down from higher MVD organs,[64] and they must clear any orders issued by them through the local MVD staffs.[65]

Local Civil Defense

MVD civil defense staffs exist in the larger cities and at important potential targets in the countryside.[66] In the smaller towns and in the villages, the entire responsibility for civil defense appears to rest on the local government authorities, who operate under general directives from the MVD,[67] and whose work is reviewed by local MVD inspectors.[68] No clear-cut evidence has been located as to how large a city has to be before it has an MVD staff.

The civil defense staffs in the cities are supposed to have jurisdiction over a variety of units of specially trained personnel, consisting either of civilians recruited for the purpose, or of military troops. Such units are to construct shelters, warn the population of the danger of an attack, and see that the necessary orders are observed if alarms are sounded. During and after an attack, the units are to rescue and evacuate victims, provide first aid, extinguish fires, repair damage to the electric, gas, telephone, and other municipal systems, to carry out decontamination in case of atomic, poison gas, or biological attack, and dispose of unexploded bombs.[69] Other duties include the partial evacuation of the area and the provision of necessities to civilians who have lost their homes.[70] [71]

The forces supposed to be available to the civil defense authorities may be classed into four main types: (1) "Services," consisting generally of employees of city government departments; (2) units recruited from personnel of various factories and similar establishments; (3) "self-defense groups," composed of individuals in nonindustrial or-

[63] DOSAAF, Uchebnoe posobie po MPVO, Moscow, 1956, p. 47.

[64] Russia (1917- RSFSR) laws, statutes, etc. Khronologicheskoe sobranie zakonov, ukazov Prezidiuma Verkhovnogo Soveta i postanovlenii Pravitel'stva RSFSR, vol. 4, Moscow, 1949, p. 337.

[65] DOSAAF, op. cit., p. 48. (It is here assumed that the same organizational pattern applies to republics and provinces as to cities.)

[66] Gvozdev, M., and V. IAkovkin, Atomnoe oruzhie i protivoatomnaia zashchita, Moscow, 1956, p. 148. (Frequent references to such staffs appear in publications such as Sovetskii patriot, especially in connection with training.)

[67] Thus, for example, in 1957 the Stalingrad Province government issued instructions for areas without MVD civil defense organizations under the title: Instructions on the civil defense of cities not included in the groups under the civil defense system, of industrial establishments and of inhabited localities of Stalingrad Province. (Polozhenie o mestnoi protivovozdushnoi oborone gorodov, ne otnesennykh k gruppam po MPVO, rabochich poselkov i naselennykh punktov Stalingradskoi oblasti.) Stalingrad, 1957. (Cf. Knizhnaia letopis', 1958, No. 10009.)

[68] Wolin, Simon, and Robert M. Slusser, The Soviet Secret Police, New York (1957), p. 160.

[69] DOSAAF, op. cit., p. 47.

[70] Gvozdev, M., and V. IAkovkin, Atomnoe oruzhie i protivoatomnaia zashchita. 2d edition, revised and enlarged, Moscow, 1958, p. 195.

[71] During the war, however, the civil defense units (principally the military formations) were called upon to participate in other operations. Thus, in the Leningrad area, the civil defense forces laid mines in the outskirts of the city, repaired railroads, and, after the Germans had been driven back, supervised the demining of the area and the collection of unexploded ammunition and military equipment. At Stalingrad, civil defense units engaged in combat with enemy infantry. (Muzei oborony Leningrada, issued by the museum. Leningrad, 1948, p. 172; Za oboronu, 1946, No. 2, p. 16; 1947, No. 4, p. 20.)

ganizations, such as schools or apartment houses; and (4) units of militarized personnel. This basic pattern was established about 1931,[72] and has undergone relatively few modifications since.

Units belonging to each of these categories are subordinate either to the civil defense staff of the whole city (in such cases, the unit may usually be sent to any point in the city) or to the staff of a particular city district (in which event it normally operates only within its own district). A typical city civil defense organization is outlined in chart 2.[73]

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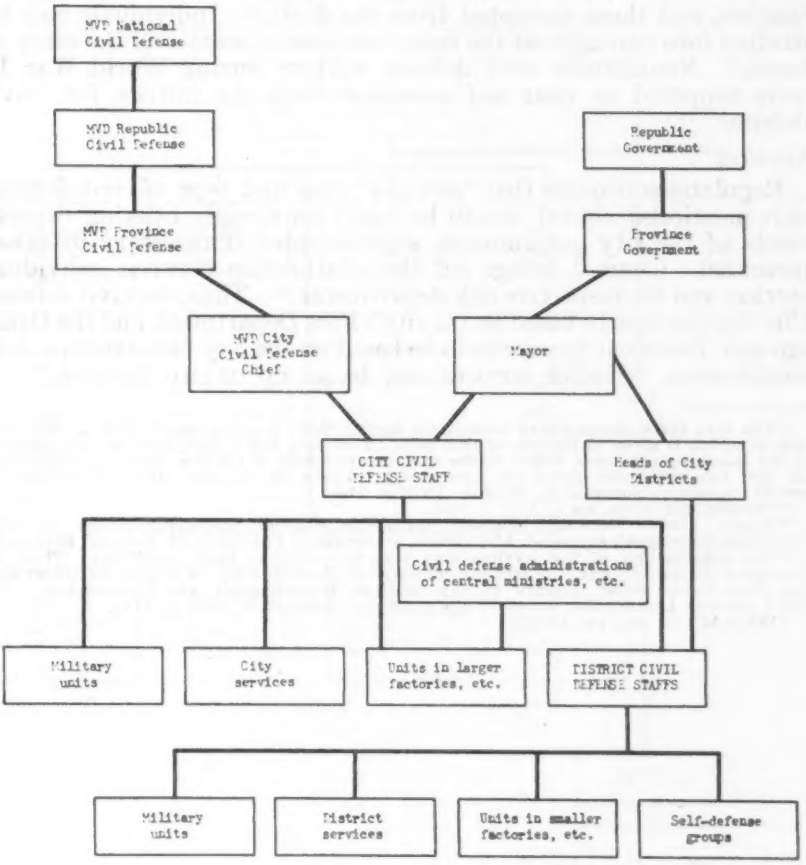
[72] However, self-defense groups were not set up until 1933. (Za oboronu, 1946, No. 15, p. 10.)

[73] As stated above, the mayor (Predsedatel' Gorodskogo ispolkoma) is concerned only with the preparations for civil defense, and issues orders in this field through the city civil defense staff. In this capacity, he has the function (but not the title) of "civil defense chief." (DOSAAF, op. cit., p. 47.) (That this is a function and not a title is indicated by the fact that such orders are signed using the title "Mayor." Cf. Leningrad, Sovet deputatov trudiashchikhsia, Biulleten'. 1941, No. 30, p. 4.) Operational command rests with the MVD civil defense organization for the city, headed by an officer with the title "City Civil Defense Chief." (Cf. Za oboronu, 1946, No. 2, pp. 16–17.) Subordinate to him is the city civil defense staff, which is headed by a chief of staff. The MVD city civil defense chief simultaneously holds the title of "Deputy of the Mayor." (Cf. Leningrad, Sovet deputatov trudiashchikhsia, Biulleten', 1941, No. 28–29, p. 3.) The latter appears to be reflected in the entry for the head of the Minsk civil defense system in the 1958 telephone directory for that city (p. 189), which reads: "Deputy city civil defense chief."

CHART TWO

TYPICAL ORGANIZATION OF CIVIL DEFENSE IN A SOVIET CITY



Source: DOSAAF. Kabshnoe posobie po MPVO. Moscow, 1956, p. 49, supplemented by other information as indicated in the text.

Civilian Personnel

Civil defense units consisting of nonmilitary personnel are recruited on a "compulsory basis" from men between 16 and 60 and women between 18 and 50, exception being made for invalids, pregnant women, women with children less than 8 years old, persons subject to mobilization, and those exempted from the draft.[74] Individuals may be drafted into two units at the same time, one at work and the other at home.[75] Nonmilitary civil defense workers during World War II were supposed to wear red armbands with the initials for "civil defense." [76]

Services

Regulations provide that "services" (the first type of civil defense unit mentioned above) are to be based on already existing departments of the city governments, supplemented if necessary by other personnel. Chart 3 brings out the relationship between individual services and the respective city departments.[77] Thus, the civil defense Fire Service is to be based on the city's Fire Department, and the Damage and Technical Service is to be based on the city Construction Administration. Similar services may be set up in city districts.[78]

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[74] The first three categories of exemptions are provided in a law dated July 2, 1941, the text of which is given in Pravda of that date. That this law is still in effect is indicated by the following reference, which quotes various provisions of the law, but also states that the last two categories listed are also exempt: Levin, M. E., and others, Zashchita ot sredstv massovogo porazheniia, Moscow, 1958, p. 110.

[75] Provided for in the law of July 2, 1941.

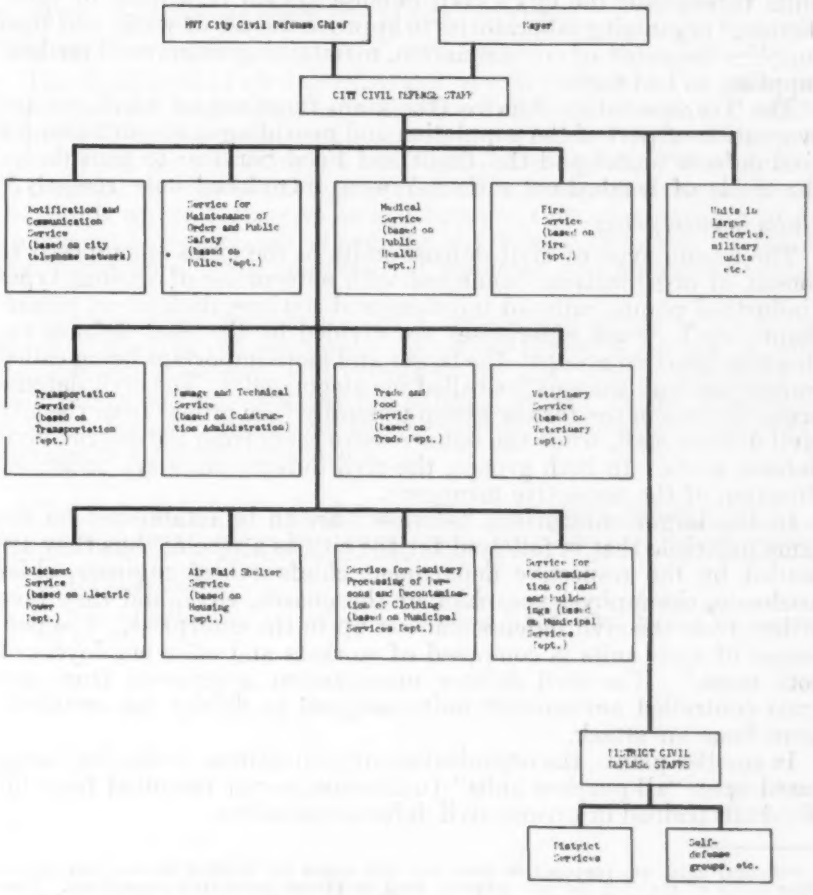
[76] Russia (1923– US.S.R.), Glavnoe upravlenie mestnoi protivovozdushnoi oborony. Polozhenie o gruppakh samozashchity domov, uchrezhdenii i predpriiatii, Moscow, 1941, p. 9.

[77] The organization of the services may vary according to local conditions. Thus, in Leningrad during the war, the services consisted of the following: Warning, Streetcar and Bus, Fire, Public Order, Electric Supply, Medical, Water Supply, and Engineering. (Cf. Muzei oborony Leningrada, issued by the museum. Leningrad, 1948, p. 171.)

[78] DOSAAF, op. cit., pp. 48–52.

CHART THREE

ORGANIZATION OF CIVIL DEFENSE SERVICES IN A SOVIET CITY


MVT City Civil Defense Chief
Mayor
CITY CIVIL DEFENSE STAFF
Notification and Communication Service (based on city telephone network)
Service for Maintenance of Order and Public Safety (based on Police Dept.)
Medical Service (based on Public Health Dept.)
Fire Service (based on Fire Dept.)
Units in larger factories, military units etc.
Transportation Service (based on Transportation Dept.)
Energy and Technical Service (based on Construction Administration)
Trade and Food Service (based on Trade Dept.)
Veterinary Service (based on Veterinary Dept.)
Blackout Service (based on Electric Power Dept.)
Air Raid Shelter Service (based on Housing Dept.)
Service for Sanitary Processing of Persons and Decontamination of Clothing (based on Municipal Services Dept.)
Service for Decontamination of Land and Buildings (based on Municipal Services Dept.)
DISTRICT CIVIL DEFENSE STAFFS
District Services
Self-defense groups, etc.

Source: Grossev, M., and V. Likhovin. Atomno-vodorodnoe i gradostroitel'stvo [Atomic-hydrogen and urban construction]. 2d ed., rev. and enl. Moscow, 1958. p. 158-160; DOSAAF. Rukovodstvo kursanta po RKhZO. 1956, p. 48-52; supplemented by data from other sources.

The functions of the services are indicated by their names. Thus, the civil defense Medical Service, based on the city Department of Public Health, is assigned the functions of organizing the first aid network, participating in rescue work and providing first aid to the wounded, organizing the processing of persons subjected to chemical, atomic, or biological attack, providing guidance for the medical units throughout the city's civil defense system regardless of jurisdiction,[79] organizing laboratories to approve the use of water and food supplies suspected of contamination, maintaining reserves of medical supplies, and so forth.[80]

The Transportation Service (the main functions of which are the evacuation of part of the population and providing transportation for civil defense units) and the Trade and Food Service (to provide for the needs of bombed-out citizens) were introduced only recently.[81]

Units in enterprises

The second type of civil defense units in the cities is supposed to consist of organizations connected with enterprises of various types (industrial plants, railroad junctions and stations, dock areas, powerplants, etc.). Such enterprises are divided by the civil defense authorities into two groups—the larger and more important being called categorized and the smaller called uncategorized.[82] The civil defense organizations in the former group generally take orders from the city civil defense staff, while the latter receive them from the district civil defense staffs. In both groups, the civil defense units are under the direction of the respective managers.

In the larger enterprises, "services" are to be established on the same principle that is followed for the city as a whole; thus they are headed by the respective department chiefs (chief engineer, chief mechanic, chief physician, chief of the guards, etc.), and they take orders from the civil defense staff set up in the enterprise. The personnel of such units is composed of workers and office employees of both sexes.[83] The civil defense organization is separate from any army-controlled antiaircraft units assigned to defend the establishment from air attack.

In smaller plants, the organization of civil defense is simpler, being based upon "all-purpose units" (unitarnoe zveno) recruited from individuals trained in various civil defense specialties.

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[79] Medical units are supposed to exist not only under the Medical Service, but also in other parts of the civil defense network, such as plants, residential houses, etc. They include the following types: Sanitary posts (sanitarnye posty), formed by the Red Cross organizations and manned by four nonmedical persons trained in first aid. Sanitary squads (sanitarnye druzhiny), which are mobile, carry basic medical supplies, and provide first aid to bombing victims and help remove them from ruins. Sanitary antiepidemic squads (sanitarno-protivoepidemicheskie druzhiny) specialize in sanitary measures against epidemics. Searching and sorting groups (poiskovo-sortirovochnye gruppy) consist of 12 persons, 1 a fel'dsher (a type of junior doctor) and the other 11, nurses. They work at bombed areas, provide first aid, sort victims by type of injury, and determine priorities for removal to hospitals. Crews for locating and removing wounded (otriady rozyska i vynosa postradavshikh) are composed of college and technical school students, as well as pupils in the 8th to 10th grades of regular schools. Each crew consists of 5 squads (druzhiny), each in turn containing 125 persons. Their duties include locating the wounded, providing them with first aid, and removing them from the damage area. Finally, there are first aid crews (otriady pervoi meditsinskoi pomoshchi), which are larger groups into which various smaller groups are incorporated. (Cf. DOSAAF, op. cit., pp. 60–62.)

[80] DOSAAF, op. cit., p. 50.

[81] Cf. Gvozdev, M., and V. IAkovkin, op. cit., p. 159.

[82] Levin, M. B., and others, Zashchita ot sredstv massovogo porazheniia, Moscow, 1958. p. 108.

[83] DOSAAF, op. cit., pp. 52–53.

Each of the national ministries and other agencies having jurisdiction over industrial establishments has a subdivision responsible for civil defense preparations there, with a name such as "Inspectorate of Armed Detachments and Civil Defense." [84] [85]

An examination of current Soviet publications has revealed very little concerning the progress in training and equipping of units in enterprises—the same being true of city "services."

Self-defense groups

The third type of civil defense unit is that required to be set up in nonindustrial enterprises, such as office buildings, educational establishments, apartment houses, and collective farms. Part of the personnel there is to be recruited into "self-defense groups," [86] organized in accordance with MVD regulations. The groups are responsible to the heads of the respective establishments; thus, the manager of an apartment house has control over the self-defense groups in the building, the groups being composed of residents and maintenance personnel.

The prescribed organization of a self-defense group is shown on chart 4. Each of the seven units consists of four to seven people, with two additional persons held in reserve for each unit.[87] The chief of each group has an "assistant for political work"; his functions presumably include building up the morale of the workers in the group and observing their performance.

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[84] Cf. Armstrong, T. E., "The Northern Sea Route." Cambridge, 1952, pp. 125–127.

[85] A number of industrial ministries were abolished in Khrushchev's decentralization drive of 1957, their functions being turned over to newly established regional economic councils. However, no information has been found as to how the civil defense organization was affected by this change.

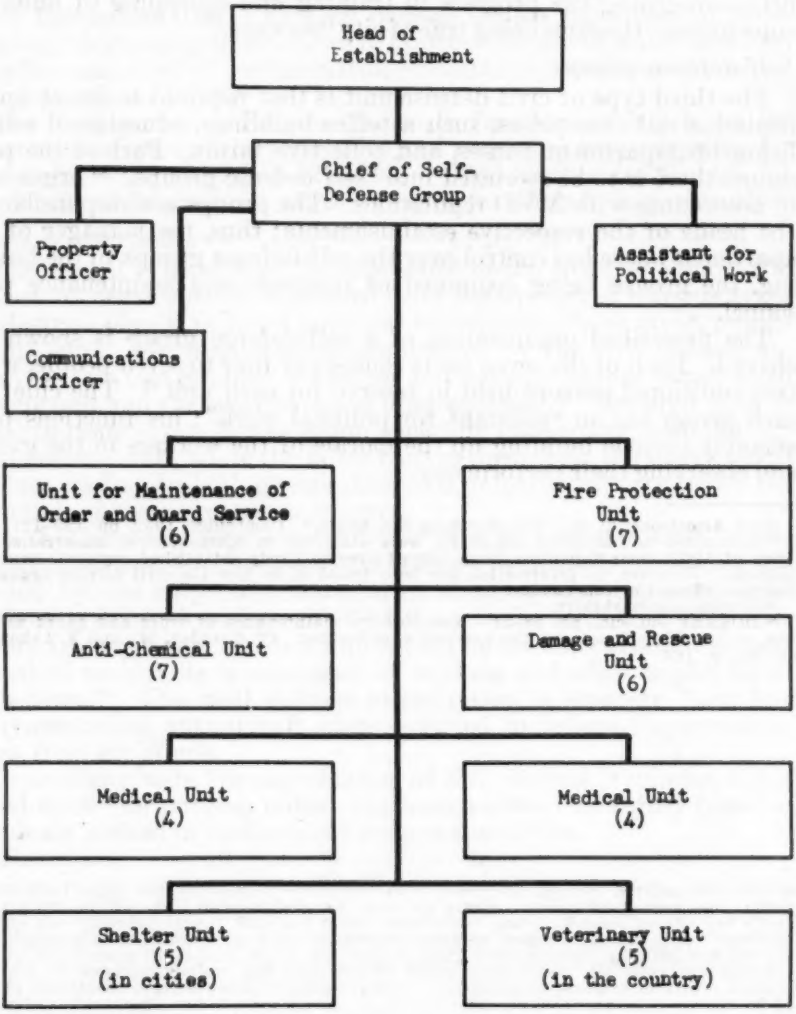
[86] Gruppa samozashchity.

[87] DOSAAF, op. cit., pp. 53–54. The unit for maintenance of order and guard service has, as one of its functions, the prevention of looting. Cf. Gvozdev, M., and V. IAkovkin, op. cit., p. 163.

CHART FOUR

ORGANIZATION OF A "SELF-DEFENSE GROUP"

(Figures indicate number of persons; each unit has two additional persons in reserve.)


Head of Establishment
Chief of Self-Defense Group
Property Officer
Assistant for Political Work
Communications Officer
Unit for Maintenance of Order and Guard Service (6)
Fire Protection Unit (7)
Anti-Chemical Unit (7)
Damage and Rescue Unit (6)
Medical Unit (4)
Medical Unit (4)
Shelter Unit (5) (in cities)
Veterinary Unit (5) (in the country)

Source: Gzozdev, M., and V. IAkovkin. Atomnoe orushie i protivoatomnaia zashchita. 2d ed., rev. and enl. Moscow, 1958, p. 162-163; supplemented by information from other sources.

In cities, according to 1951 information, one self-defense group was supposed to be set up for each apartment house having 300 tenants; if a building had less than this number, it was to join forces with other houses in setting up a group. In large, multistory buildings with more than 1,000 tenants, one group was to be formed for every 500 to 700 individuals.[88] Later regulations are more flexible, leaving the number of units to be established to the judgment of the city governments.[89]

In the country, present regulations provide that at least one group is to be set up in each collective and State farm. In villages, one group must be organized for every 500 persons. If a village has 250 to 500 inhabitants, a simplified organization, an "all-purpose unit" (unitarnoe zveno) is to be established, while if there are less than 250 persons, there would be only a "civil defense post." [90]

The organization table of the self-defense groups was criticized in 1947 by Maj. Gen. E. Lagutkin, who, having been Leningrad civil defense chief during the war, was in as good a position to do so as anyone in the Soviet Union. He said that the system's weakness lay in the fact that it could not concentrate all of the personnel of the group upon the work most urgently needed. Thus, he felt, if fires break out, all the personnel in the group should fight them, and not the Fire Protection Unit alone.[91] However, the Soviet authorities must have rejected the General's proposal, since the old organization substantially remains.

Progress in training and equipping self-defense groups in apartment houses (which presumably would have a lower priority than units in enterprises, etc.) was reported as being behind official expectations in a DOSAAF publication as late as April 1958:

> Residential self-defense groups play an important role in the organizing of civil defense. Nevertheless, district committees and primary organizations of the DOSAAF are still devoting little attention to the preparing of this part of the system. Practical training is not being carried out in such groups, and there is a shortage of the equipment prescribed under the regulations.[92]

Militarized Personnel

The military units under the MVD civil defense staffs totaled a considerable number during World War II; [93] now they have been greatly reduced,[94] but presumably can be mobilized again on short notice if necessary. They were used in functions for which the civilian personnel was judged by the authorities to be inadequate. Thus, during the siege of Leningrad, the uniformed troops were engaged in such work as communications, reconnaissance, and medical attendance.[95] Civil defense troops were organized into companies, battalions, and regiments.[96] Many women were enrolled in these for-

[88] Savitskii, I. I. MPVO zhilogo doma. Moscow, 1951, p. 6.
[89] Levin, M. E., and others, op. cit., p. 107.
[90] Voennye znaniia, 1957, No. 2, p. 22.
[91] Za oboronu, 1947, No. 6, p. 2.
[92] Sovetskii patriot, Apr. 9, 1958, p. 1.
[93] A figure of 7,000 is given for a fraction of the troops in the Leningrad area in 1944. (Cf. Za oboronu, 1946, No. 2, p. 16.)
[94] Ibid.
[95] Za oboronu, 1946, No. 2, p. 11.
[96] Ibid., 1943, No. 15–16, p. 6.

mations.[97] Despite the fact that these troops were under the MVD, they were still referred to as "Red army soldiers." [98] These troops, were, however, separate from the army personnel manning antiaircraft guns and otherwise engaged in active defense.

1. Uniformed civil defense troops, supplementing the nonmilitary civil defense workers, undergoing training in chemical warfare during World War II.

Budget

The Soviet civil defense budget has not been published. However, it is known that expenditures are distributed among various agencies.

City governments must cover the costs of equipment and training for the services based on their departments.[99] They also supply equipment for self-defense groups in residential buildings under the city's jurisdiction.[1]

Equipment and training in factories, plants, and so forth, are provided by the ministries or other organizations to which they are subordinate. Such agencies are also responsible for the equipment of self-defense groups in the apartment houses under the jurisdiction of such enterprises.[2]

Collective farms and other establishments in the country are expected to absorb the expenses for their self-defense groups.[3]

Training of the population as a whole in the fundamentals of civil defense is supplied by the DOSAAF, with instructors for the first

[97] Ibid.
[98] Ibid., 1946, No. 2, p. 11.
[99] DOSAAF, op. cit., p. 47; also, law of July 10, 1941, cited above.
[1] Gvozdev, M., and V. IAkovkin, op. cit. (2d ed.), p. 163.
[2] Ibid.
[3] Ibid.

aid lessons provided by the Soviet Red Cross.[4] Both these organizations are self-supporting (at least in theory), with their income based primarily on membership dues. These two organizations also are responsible for the training of the "self-defense groups," regardless of jurisdiction.[5]

Thus, the MVD seems to bear only a part of the civil defense costs, such as administrative expenses, the maintenance of civil defense staffs, and so forth.

PROTECTION AGAINST BOMBING

Dispersal

One of the strongest features of Soviet civil defense is the extent to which the disperal of cities and industrial installations has been effected. The first concrete step in this direction was taken by the Soviets in June 1931, shortly after Soviet civil defense doctrine was revised [6] (though civil defense was not mentioned in connection with this move). At that time, the Communist Party adopted the policy of halting the construction of new industrial plants in large cities.[7] As of 1932, the establishment of new factories in Moscow and Leningrad was forbidden, and the Government gradually extended this restriction to other areas.

The effect of this regulation was to channel industrial expansion elsewhere, resulting in the creation of many new cities and the conversion of existing small towns into industrial centers. Thus, although heavy industry production in Moscow had grown nearly twice as fast as production for the U.S.S.R. as a whole from 1913 to 1932 (amounting to 175 percent), the introduction of the restrictions drove the figure down to 82 percent for the period between 1932 and 1956.[8] (The fact that production in the city grew at all is attributable not only to the modernization and expansion of existing plants, but also largely to the exceptions made to permit the location of strategically important new plants in Moscow where they could be more closely supervised.)

[4] Ibid.
[5] Ibid.
[6] Cf. p. 40.
[7] Kommunisticheskaia partiia Sovetskogo Soiuza v rezoliutsiiakh i resheniiakh s"ezdov, konferentsii i plenumov TSK, vol. 3. Moscow, 1954, pp. 113–126.

[8] Figures for the U.S.S.R., Moscow, and Moscow Province are given below (based on data in: Narodnoe khoziaistvo SSSR; statisticheskii sbornik. Moscow, 1956, p. 45; Narodnoe khoziaistvo RSFSR; statisticheskii sbornik. Moscow, 1957, p. 106). They show the growth of heavy industrial production for the respective areas, taking the earlier year in each case as 100 percent.

	Growth from 1913 to 1932	Growth from 1932 to 1956
	Percent	*Percent*
U.S.S.R.	352	1,235
Moscow (city)	578	1,055
Moscow Province (excluding the city)	234	1,500

While the rate of growth is exaggerated by Soviet accounting methods, the figures in the text remain valid if it is assumed that the basis for determining those in the table is consistent.

Since large cities in the U.S.S.R. have continued to grow despite the effort to contain them, the Soviets have been forced to take further steps. Thus, a policy of establishing townships near large cities, but separated from them by open country, was announced by Nikita Khrushchev at the 20th Congress of the Soviet Communist Party in 1956 as follows:

> We know that the natural increase in the population of our cities is quite large. * * * It is * * * desirable to spread out the population of large cities by building small, well-appointed townships around Moscow, Leningrad, Kiev, Kharkov, and other centers. * * * This means that good, well-appointed houses should be built not on the territory of the large cities themselves, but a certain distance from them, creating such living conditions there that people would seek to move there. Some enterprises should be moved to such townships, so that people could work there.[9]

Considerations of civil defense were not raised by Khrushchev in this connection, but on other occasions Soviet statesmen have bragged about the Soviet advantage over the United States in the extent of the dispersal of industry.[10]

Thus, in November 1957, Khrushchev told Henry Shapiro, United Press correspondent in Moscow, in connection with the threat of nuclear bombing:

> One must remember that there are cities in the United States with a very large concentration of industry—New York, Chicago, San Francisco, and others. Our industry is more dispersed. Furthermore, the reorganization of the administration of industry that we carried out also provides for a more autonomous administration of industry. This also improves our strategic position.[11]

A Soviet source states that 118 new cities had been built between 1951 and 1956 alone. In the last thirty years, 618 cities have come into existence, and, in addition, 1,175 "workers' settlements" have grown up around new factories.[12]

Although the Soviet Union has more inhabitants than the United States, there were only two cities with populations of over 1,000,000 in the U.S.S.R. in 1956, as compared with fourteen metropolitan areas with over 1,000,000 each in the United States reported in the 1950 census. The number of individuals in these two Soviet cities is given as 8,015,000[13]; that in the American areas mentioned was about 44,400,000.[14] Table One gives the populations of the ten largest city areas in each country for purposes of comparison.

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[9] Current Soviet policies: II. The documentary record of the 20th Communist Party Congress and its aftermath. New York, Frederick A. Praeger (1957), pp. 49–50.

[10] Reinhardt, Col. G. C., in: B. H. Liddell Hart, editor, The Soviet Army, London, Weidenfeld & Nicolson (1956), p. 427. Cf. also Marshal Semen Budenny's remarks as cited in the New York Times, Apr. 12, 1956, p. 10.

[11] Pravda, Nov. 19, 1957, p. 2.

[12] Sovetskii Soiuz, 1958, No. 7, p. 24.

[13] Narodnoe khoziaistvo SSSR; statisticheskii sbornik. Moscow, 1956, p. 24. The population of Leningrad with the suburbs is given as 3,176,000; no figure for Moscow suburbs is shown.

[14] World Almanac, 1958, p. 505.

TABLE 1.—*10 largest metropolitan areas in the United States and the Soviet Union*

UNITED STATES, 1950		SOVIET UNION, 1956	
New York, northeast New Jersey	12,912,000	Moscow	4,839,000
Chicago	5,495,000	Leningrad	3,176,000
Los Angeles	4,368,000	Kiev	991,000
Philadelphia	3,671,000	Baku	901,000
Detroit	3,016,000	Khar'kov	877,000
Boston	2,370,000	Gor'ky	876,000
San Francisco-Oakland	2,240,000	Tashkent	778,000
Pittsburgh	2,213,000	Kuybyshev	760,000
St. Louis	1,681,000	Novosibirsk	731,000
Cleveland	1,466,000	Sverdlovsk	707,000

Sources: World Almanac, 1958, p. 505; Narodnoe khoziaistvo SSSR: statisticheskii sbornik. Moscow, 1956, p. 24.

CITY PLANNING

City planning in the U.S.S.R. has been strongly influenced by civil defense considerations. The wide streets and parks, embellished with verdure, characteristic of newer Soviet cities (and sometimes described as having "artistic and esthetic significance") [15] admittedly are built for civil defense purposes. Thus, a 1958 source states:

> To create barriers against the spread of fires and to keep evacuation routes free of debris during the liquidation of the results of atomic attack, zones planted with greenery (boulevards, parks) are laid out in populated places.[16]

This policy was in effect as far back as 1940, and perhaps even earlier.[17] In that year, the Soviet Academy of Municipal Services prepared a draft of standards for city planning in which civil defense requirements were taken into account. Among other points, these standards called for the construction of wide streets, in the following terms:

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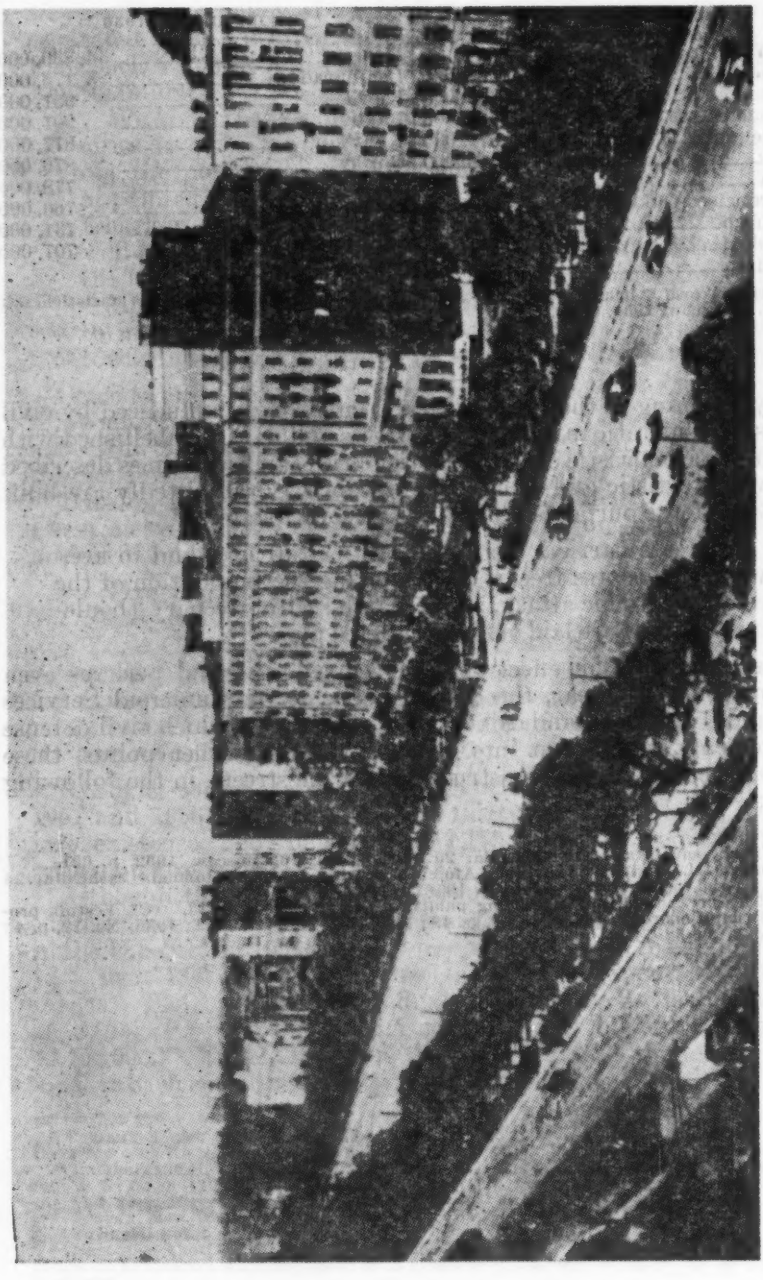
[15] Bol'shaia sovetskaia entsiklopediia, 2d edition, vol. 16, Moscow, 1952, p. 621.
[16] Gvozdev, M., and V. IAkovkin. Atomnoe oruzhie i protivoatomnaia zashchita, 2d edition, revised and enlarged. Moscow, 1958, p. 164.
[17] Articles on the subject were being published as far back as 1933. (Cf. Vestnik protivovozdushnoi oborony, 1933, No. 10, p. 48; 1933, No. 11, pp. 50–52; 1933, No. 12, p. 4; 1934, No. 2, pp. 52–54.)



2. Wide avenues and broad spacing of buildings reflect Soviet civil defense instructions. The Leningrad Highway in Moscow (1957).

> The minimum width of streets between the lines beyond which construction is permitted * * * cannot be less than the sum of the heights of the buildings lining the streets.[18]

Thus, as an illustration, if the buildings on each side of a street were 100 feet high, the street would have to be 200 feet wide. This specification, it was frankly stated, was included at the request of the civil defense authorities so that streets would not be "blocked by the demolition of buildings by high explosive bombs.[19]

Civil defense considerations have also led to the wide spacing of buildings. A recent book states:

> A considerable reduction in the extent of damage to cities and important installations is attained through spreading them out over large areas. This prevents the possibility of the destruction of several important installations simultaneously and facilitates the measures taken for the liquidation of the results of atomic attack.[20]

The 1940 draft of city planning standards also included, admittedly for civil defense reasons, requirements that buildings be built far apart. Thus, residential buildings were not to cover more than 30 percent of the territory on which they were located, while office and industrial buildings of more than local significance were not to cover more than 25 percent.[21]

Construction of New Buildings

That the Soviet civil defense authorities have had a voice in the approval of construction plans for new buildings at least as far back as 1941 is indicated by the following statement published in that year:

> Architects and builders of civil construction are obliged to take into account the requirements of air defense in every house that is built and to come to an agreement with the local civil defense staff concerning the measures to be taken in this field.[22]

From 1941 to 1956, the amount of housing available in Soviet cities and urban-type settlements is said to have risen from 421 million square meters to 668 million,[23] which would mean that over a third of the urban housing now in existence in the country has theoretically been built in accordance with the requirements of the civil defense authorities.

The Soviet civil defense has used two basic approaches in this field. One has been the issuance of general specifications to be followed by architects and builders. Thus, an architect preparing plans for a factory, according to a publication appearing shortly after World War II, was expected to meet "the requirements of civil defense" which were "set out in special instructions." [24] The body issuing these instructions was not named, but it was doubtless the MVD's main adminis-

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[18] Dobrotvorskii, B. N., Protivovozdushnaia oborona v grazhdanskom stroitel'stve. Moscow, 1940, p. 22.
[19] Ibid.
[20] Gvozdev, M., and V. IAkovkin, op. cit., p. 164.
[21] Dobrotvorskii, B. N., op. cit., p. 22.
[22] Dobrotvorskii, B. N., op. cit., p. 6.
[23] Narodnoe khoziaistvo SSSR; statisticheskii sbornik, p. 163.
[24] Mashinostroenie; entsiklopedicheskii spravochnik, vol. 14. Moscow, 1946, p. 394.

tration of civil defense. The publication did not detail all the "special instructions," but it did state that, as a measure to prevent the accumulation of pockets of poison gas, the outlines of the buildings were to be as simple as possible, preferably quadrangular, with few projections. The construction of enclosed courtyards, for the same reason, was considered "undesirable." [25]

The second approach has been to have the local civil defense authorities approve the blueprints for individual buildings constructed in their areas. However, this program appears to have proceeded in a spotty fashion.

Thus, in September 1943 the Soviet Government established a Committee on Matters of Architecture, with "authority * * * over activities in the field of architecture of various organizations and establishments regardless of their jurisdictions." [26] It was not until February 1945, however, that it reached an understanding with the Main Administration of Civil Defense. This agreement provided that MVD representatives would not only participate in the establishment of building specifications, but would also approve plans for individual buildings, and would have a hand in the committee's operations on the national, provincial, and local levels.[27] However, the present status of this agreement is not known; in 1948 the committee appears to have been abolished and its work taken over by other organizations.[28]

But even before the committee ceased operation, officials in such an important city as Stalingrad do not appear to have been familiar with (or did not live up to) the 1945 agreement. Thus, in 1946, the Stalingrad city committee of the Communist Party passed a "special resolution requiring that construction work in the city be carried on in accordance with the instructions and norms of the main administration of civil defense." It was only after this resolution had been passed that the local civil defense authorities were able to announce, "We succeeded in arranging it so that not a single building plan will be approved by the expert commission without the consent of the city civil defense." [29]

More recent publications do not mention the participation of the civil defense in such approval. A 1958 book lists a number of agencies which have to approve building plans (e.g., the city construction department, the health department, the fire department, the bank, etc.), but fails to mention the civil defense authorities.[30]

There have been some reports in Western countries that some Soviet factories are being built underground.[31] However, doubtless for reasons of security, no hint of such a program has been found in open Soviet sources. It would be of course relatively simple to install a small amount of equipment in existing mines. However, the construction on a large scale of substantial underground plants would tax heavily the material and technical resources of the Soviet construction industry, though if the Government deemed it necessary, some such plants could certainly be built.

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[25] Ibid.
[26] Russia (1923– U.S.S.R.) Laws, statutes, etc. Sdornik postanovlenii, prikazov, i instruktsii po voprosam planirovki naselennykh mest i arkhitekturnogo proektirovaniia. Moscow, 1948, p. 3.
[27] Ibid., pp. 208–209. (The text of the agreement is given here.)
[28] Cf. Arkhitektura i stroitel'stvo, 1949, No. 7, p. 1, and ibid., 1949, No. 8, p. 1.
[29] Za oboronu, 1947, No. 9, p. 9.
[30] Naumov, A. N. Organizatsiia i planirovanie gorodskogo stroitel'stva. Moscow, 1958, p. 55.
[31] E.g., a Dutch article cited in: NATO Civil Defense Bulletin. Paris, vol. 4, No. 2, April 1957, p. 21.

"Hardening" of Potential Targets

Some general statements have been found in Soviet publications concerning methods of "hardening" existing buildings and other structures against aerial attack. Thus, according to one source:

> The * * * engineering and technical measures to be taken in advance [of hostilities] include: increasing the stability of existing important buildings, structures, and municipal and power networks; * * * the carrying out of the more laborious fire preventive measures to provide protection against conflagrations; the camouflage and blackout of cities and economic installations; * * * the construction and equipment of shelters; and other measures.[32]

Among more specific steps recommended are those of increasing the fire resistance of easily combustible structures, the strengthening of water supply pipes, the construction of additional reservoirs, provision of other sources of water supply, etc.[33]

How far such programs have actually been realized in the U.S.S.R. cannot be determined from the data available; the Soviets are particularly reluctant to publicize specific measures taken.

Designs of Shelters

Soviet civil defense publications describe three basic types of shelters to be used in case of air attack: reinforced, concrete shelters of the usual type (*ubezhishche*), earth shelters (*ukrytie*), and underground structures (such as subways) used for shelter purposes. Though some American civil defense procedures have called for taking shelter in basements, the Soviets as a rule do not consider basements as suitable unless they have been specially adapted for civil defense purposes.

No reference has been found in Soviet published sources to shelters dug at great depths and capable of withstanding direct hits from nuclear bombs.[34]

Reinforced shelters

The first type of Soviet shelter may be characterized as having solid walls and reinforced concrete roofs. Such shelters are described as providing the "fullest protection." [35]

The commonest form in cities and in factories is said to be shelters constructed in the basements of multi-storied buildings. They may cover all or part of the basement, and must be covered by reinforced concrete roofs. The roofs may be specially built, or an existing floor above the basement may be used, reinforced if necessary by steel girders.[36]

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[32] Gvozdev, M., and V. IAkovkin, op. cit., p. 155.
[33] Gvozdev, M., and V. IAkovkin. Atomnoe oruzhie i protivoatomnaia zashchita. Moscow, 1956, pp. 126, 128.
[34] Aspects of the construction of such shelters in the United States are discussed, for example, in: Rand Corp., Report on a Study of Non-Military Defense. [Santa Monica, 1958], p. 7.
Reports have appeared in the western press concerning an "underground city" 400 meters deep, some 11 kilometers from the Kremlin and connected with it by tunnels. (Cf. Schützsack, Udo. Die Zivilverteidigung hinter dem Eisernen Vorhang. In: Ziviler Luftschutz, vol. 21, No. 4, April 1957, p. 93.) Even if such a shelter is built, it would, of course, be intended for high government and party functionaries, and not for the bulk of the population.
[35] DOSAAF. Uchebnoe posobie po MPVO. Moscow, 1956, p. 62.
[36] Ibid., pp. 63–64.

3. Soviet concept of a basement shelter during an air raid in a possible future war.

4. Soviet sketch of an outside reinforced concrete shelter according to present-day designs.

Such shelters are described as usually having room for 100 to 150 persons, and as being divided by heavy walls into sections accommodating 50 to 75 persons. Benches are to be set up, with shelves above them on which persons can sleep. At least two doors are recommended, so that an exit may remain if one is blocked by debris. Special designs are reported as existing for hospitals, nurseries and kindergartens.[37]

If the shelter is to provide protection against radioactive substances, poison gas and certain forms of biological attack, Soviet manuals state that special filtration apparatus must be installed in the ventilation system, and the doors and other openings must be hermetically sealed.[38]

Reinforced shelters may also be constructed outside of buildings—in parks and other open areas. They may be approximately the same size as basement shelters, but in some cases may be considerably larger.[39] Three basic types are distinguished: massive concrete shelters, part of which are above the ground; shelters dug into the ground and covered with layers of earth and concrete; and concrete tunnels driven into sides of embankments. Such shelters may also be sealed against radioactive fallout.[40]

Earth shelters

Earth shelters are dug into the ground; the sides of the shelter are lined with boards and logs (though other materials may be used, such as steelplates, girders, etc.). No reinforced concrete roof to withstand blast is provided.

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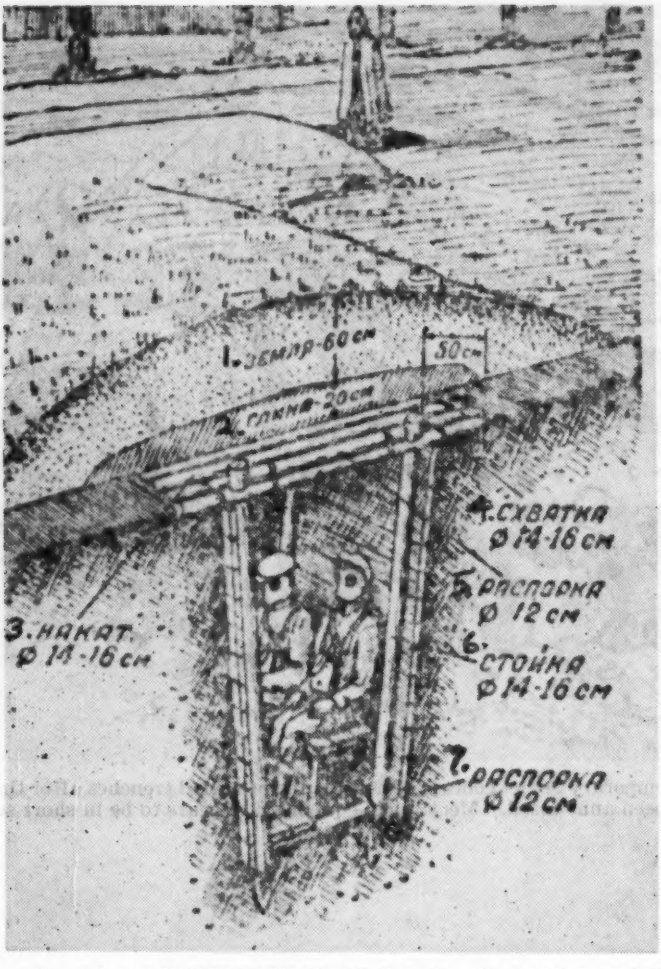
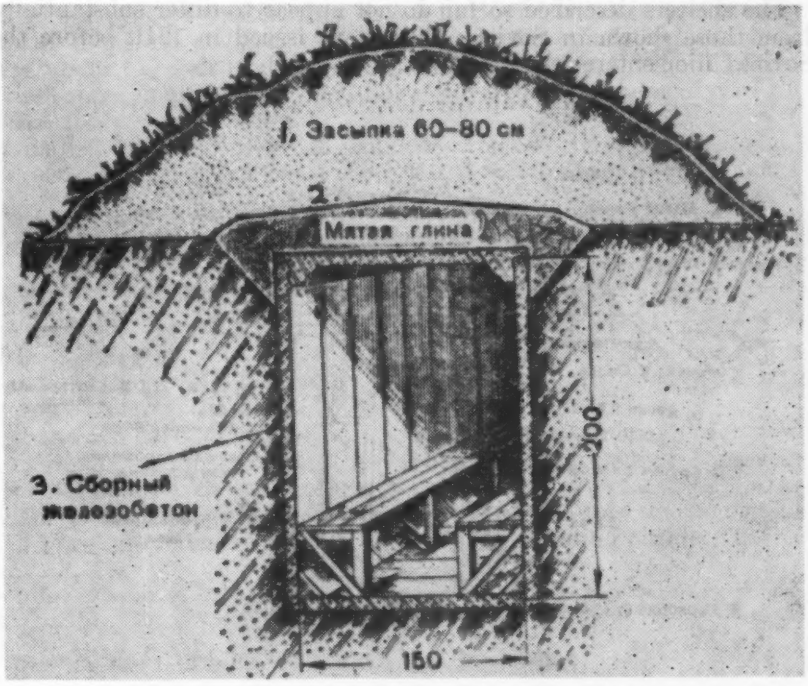
[37] Ibid., p. 66.
[38] Ibid., p. 67.
[39] Miroshnikov, I. Kollektivnye sredstva protivoatomnoi zashchity. Moscow, 1957, p. 22.
[40] DOSAAF, op. cit., pp. 62–63.

5. Contemporary Soviet concept of the digging of roofed trenches after the "Alert" has been announced. Mechanical equipment appears to be in short supply.



6. Cross-section of a roofed trench lined with boards. Gas masks are being worn as protection against fallout. Legend: 1. Earth. 2. Clay. 3. Timber roof. 4. Cross bar. 5. Tie beam. 6. Brace. 7. Tie beam.



7. Roofed trench made of prefabricated reinforced concrete blocks. Legend: 1. Filler. 2. Kneaded clay. 3. Prefabricated reinforced concrete.

Three principal types are described in Soviet publications. One consists of trenches (shchel') dug about 6½ feet into the ground and roofed with beams in turn covered with a small layer of clay and then 2 or 2½ feet of earth. Such trenches are to be dug in a zigzag pattern, each section being about 40 feet long and providing for about 20 persons, sitting on benches in a single row. They are supposed to be constructed in 3 sections, each trench thus holding about 50 to 60 persons.[41]

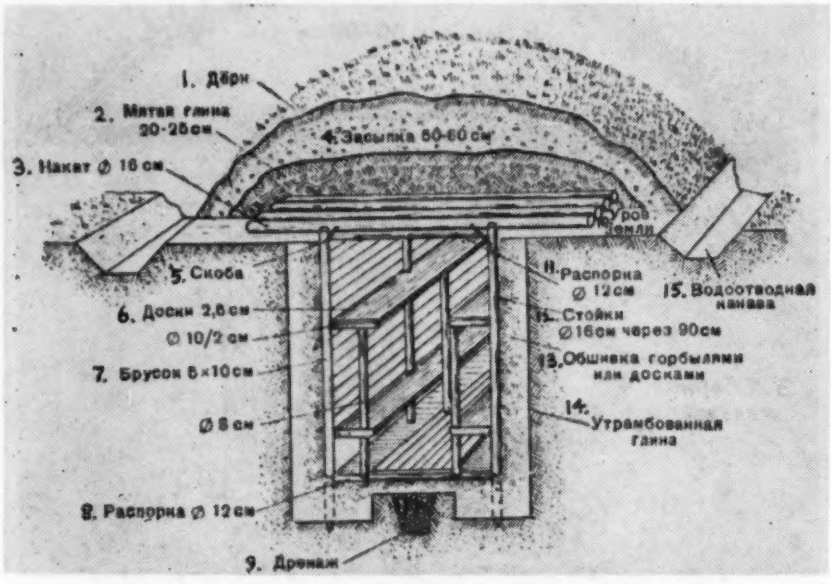
Wider trenches, containing two rows of benches, may also be built.

A second type consists of dugouts (zemlianka) which are basically built on the same principle as the roofed trenches, but are intended for longer occupancy, having heating, shelves for sleeping, drainage ditches, etc. A standard dugout has a capacity of 30 to 40 persons. Some may be built with reinforced concrete slabs.[42]

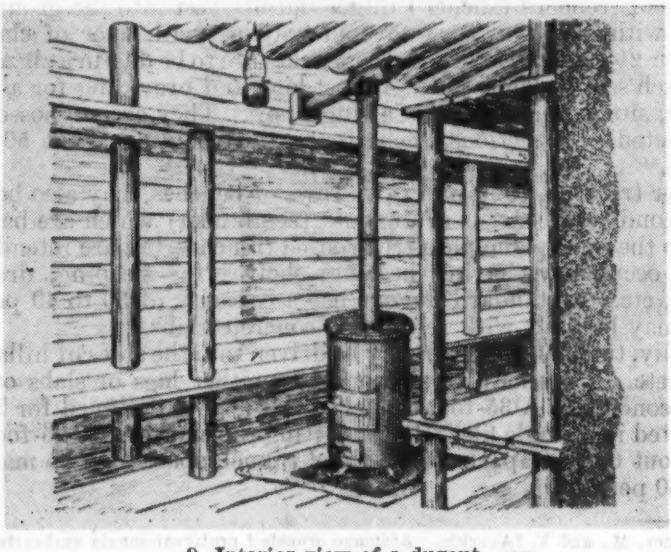
Finally, tunnels (galerei) may be driven into the sides of hills, river banks, etc. They may be supported by either logs or slabs of reinforced concrete. A 35-foot tunnel of this type is designed for 20 people, seated in a single file. By connecting the ends of two 25-foot tunnels about 60 feet apart with a third tunnel, space may be made for about 60 persons.[43]

[41] Gvozdev, M., and V. IAkovkin. Atomnoe oruzhie i protivoatomnaia zashchita, 2d ed., rev. and enl. Moscow, 1958, p. 155.
[42] DOSAAF, op. cit., pp. 72, 74.
[43] Ibid., p. 74.

The shelters described so far do not appear to differ substantially from those shown in Soviet publications issued in 1941, before the Soviet Union entered the war.[44]



8. Cross-section of a dugout as visualized in a 1958 Soviet publication. Legend: 1. Sod. 2. Kneaded clay. 3. Timber roof. 4. Filler. 5. Cramp iron. 6. Boards. 7. Bar. 8. Tie beam. 9. Drainage. 10. Ground level. 11. Tie beam. 12. Braces. 13. Facing of poles or boards. 14. Rammed clay. 15. Drainage ditch.



9. Interior view of a dugout.

[44] Comparison may be made, for instance, of the illustrations given on p. 72 of the previously cited work by DOSAAF, with that on p. 35 of: Dobrotvorskii, B. N., op. cit. Likewise, the illustrations given on p. 63 of the former may be compared with those on pp. 41 and 76 of the latter.

A newer type of shelter, first shown in Soviet books in 1957,[45] consists of a tunnel constructed of prefabricated reinforced concrete rings, about 6½ feet in diameter and about 4 inches thick. The top of the tunnel is at ground level, but is covered with about a yard of earth.[46]

This new type, as well as dugouts constructed from reinforced concrete slabs (mentioned above), is praised as follows by a Soviet writer:

> Shelters built of prefabricated reinforced elements may be constructed ahead of time, as long as the necessary maintenance is provided. They may be constructed quickly with the use of modern industrial construction methods.[47]

The fact that they can be built in peacetime makes them important to the Soviets, since in this respect they differ from the other types of earth shelters described above, which are not built in advance, but are dug only upon the introduction of the "Alert."

At the end of 1958, Soviet authorties also released designs for new types of underground shelters to be built in the yards of houses in suburban areas, each containing space for one or two families. Also built in peacetime, such a shelter with an area of 3 to 4 square meters would provide room for four to six persons, including children.[48]

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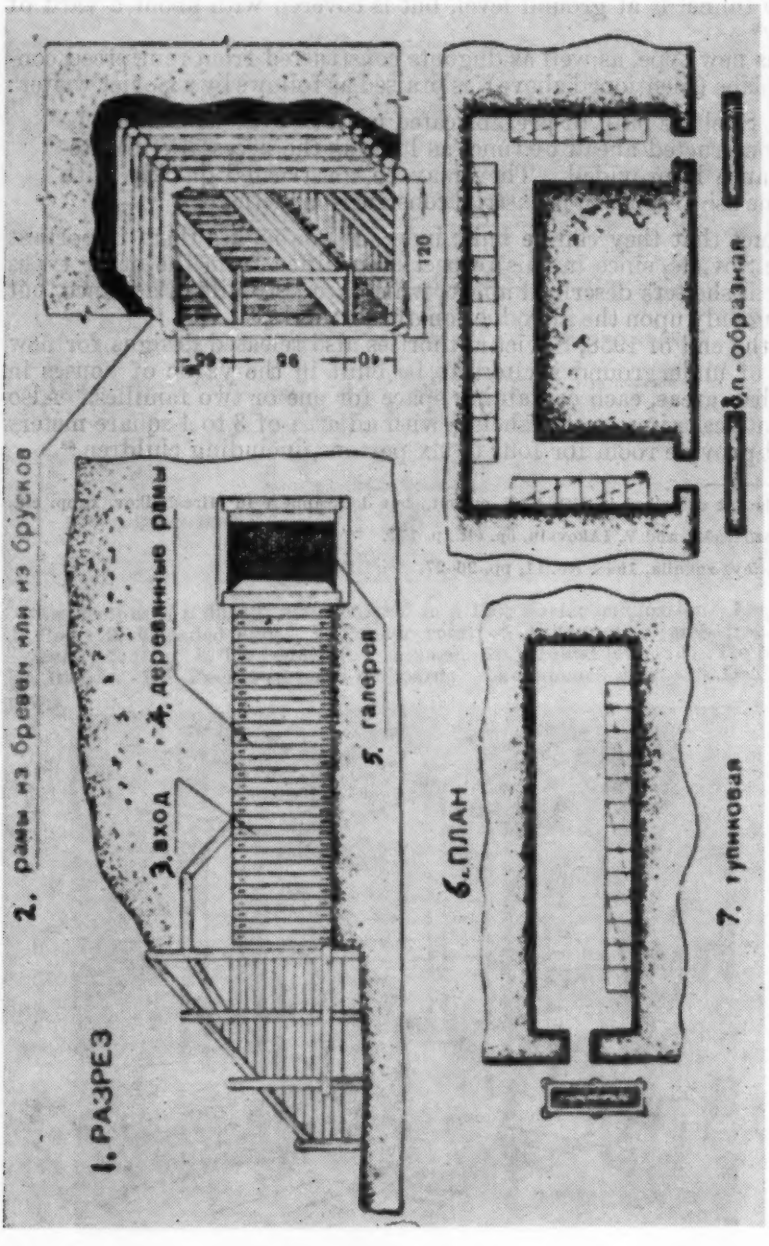
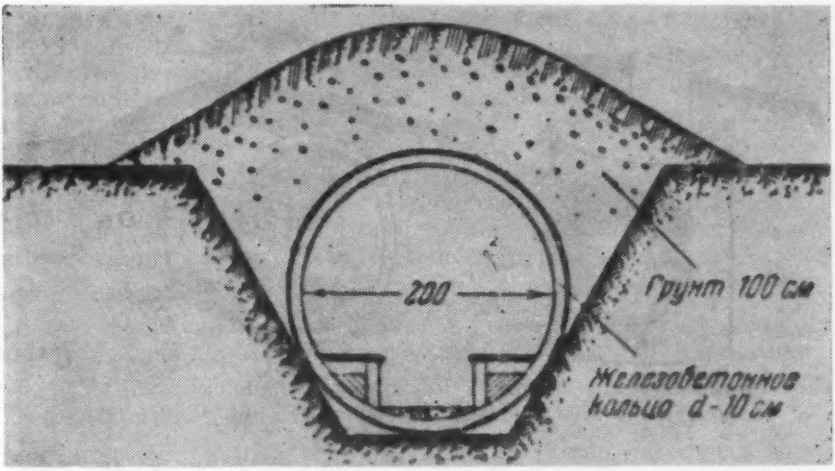
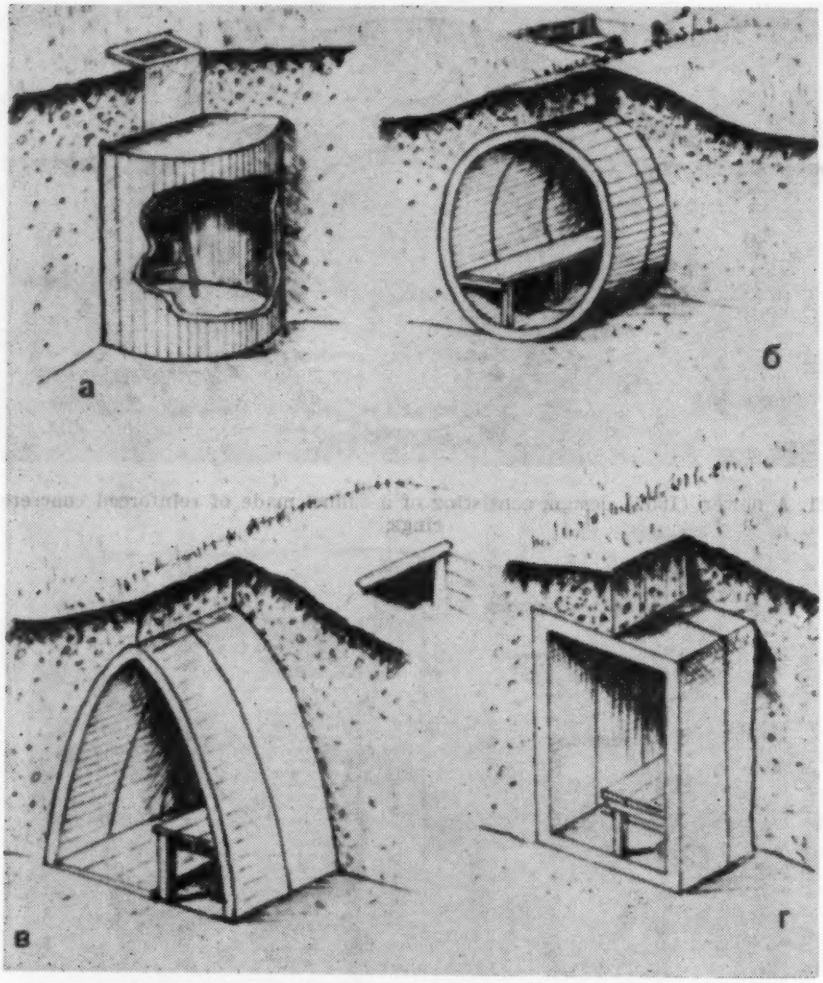
[45] It is not described in DOSAAF, op. cit., but does appear in Miroshnikov, I, op. cit., p. 29.
[46] Gvozdev, M., and V. IAkovkin, op. cit., p. 177.
[47] Ibid.
[48] Voennye znaniia, 1948, No. 11, pp. 26–27.



10. Soviet design for a tunnel shelter. Legend: 1. Cross-section. 2. Log or beam supports. 3. Entrance. 4. Wooden supports. 5. Tunnel. 6. Layout. 7. Dead-end tunnel. 8. U-shaped tunnel.



11. A newer (1957) design, consisting of a tunnel made of reinforced concrete rings.



12. Recent (1958) designs for family-size suburban shelters. Upper left: Cylindrical vertical shelter (made of prefabricated reinforced concrete slabs, of solid reinforced concrete, or of brick walls and a reinforced concrete roof). Upper right: Cylindrical horizontal shelter (solid reinforced concrete or metal sections). Lower left: Arched shelter (same materials). Lower right: Right-angled shelter (prefabricated reinforced concrete slabs, metal sections, wooden beams, or other materials).

Subways and other underground structures

Soviet authorities call subways "a reliable refuge" in case of atomic attack.[49] The probable use of a subway may be surmised from the procedures followed in the Moscow subway during World War II. When an air raid warning was sounded, the trains were stopped, and both stations and tunnels were opened to part of the population for shelter. The platforms and the trains which happened to be standing at the stations were reserved for women with children, aged individuals, and

[49] Vorob'ev, E. I., and U. IA. Margulis. Atomnaia energiia i protivoatomnaia zashchita. Moscow, 1956, p. 70.

so forth. Other persons were directed to the tracks, which were reached by special removable stairs installed at the platforms.[50] [51]

A limited amount of shelter space may be provided by other underground construction in the U.S.S.R. Thus, passages for truck traffic are reported to be characteristic of a number of the newer large buildings in Moscow.[52]

During World War II, other underground tunnels were employed as shelters, such as, for example, catacombs at Sevastopol, Odessa, and Kerch, and underground shafts at Stalingrad. The use of mines, railroad tunnels, and so forth, as shelters is also visualized.[53]

Soviet evaluation of shelters

Some writers in the U.S.S.R. highly praise the shelters envisaged under Soviet plans, obviously in an attempt to reassure the population:

> [Reinforced concrete] shelters in basements and those built separately provide a sure defense against atomic weapons.[54]

However, other authors are more candid and admit the obvious, that reinforced concrete shelters do not provide protection against direct hits by nuclear weapons. Thus, one author states that reinforced shelters "protect people against the blast of an atomic bomb," but adds the important qualification, "at some distance from the center of the blast." [55]

Large-scale construction of shelters designed primarily to provide protection against radioactive fallout has been under discussion in the West. Thus, an account of the report of the Gaither Committee states:

> The Committee proposed that the Government build fallout shelters throughout the Nation to protect civilians against the radiation following an atomic attack.[56]

The Soviets are relying heavily on roofed trenches for civil defense purposes, as has been noted. Such shelters would play a large role in the cities, and an almost exclusive one in the country.[57] However, the Soviet authorities do not regard such trenches by themselves as providing sufficient protection against radioactive fallout. Thus, a 1958 civil defense publication warns:

> * * * earth shelters do not provide protection against * * * radioactive dust * * * since they cannot be hermetically sealed with sufficient adequacy. Therefore those taking refuge there must have gas masks.[58]

Still, Soviet writers state that such trenches are of value against the initial radiation and other effects of nuclear weapons.[59]

Even in reinforced concrete shelters, protection against fallout is considered to be provided only with the installation of sealed doors as

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[50] Za oboronu, 1946, No. 15, p. 6.
[51] The shelter capacity of Soviet subways is discussed on p. 93 ff.
[52] Oltarzhevskii, V. K. Stroitel'stvo vysotnykh zdanii v Moskve. Moscow, 1953, p. 162.
[53] Voennye znaniia, 1957, No. 1, p. 24.
[54] DOSAAF, op. cit., p. 64.
[55] Miroshnikov, I., op. cit., p. 18.
[56] New York Times, Dec. 21, 1957, p. 8, col. 4.
[57] Cf. p. 90 ff.
[58] Levin, M. E., and others, Zashchita ot sredstv massovogo porazheniia, Moscow, 1958, p. 98.
[59] Ibid.

well as filtration apparatus to clear the air pumped into the shelter of radioactive dust.[60]

An American source points out that the Soviets have available a further measure, though only a potential one, against radioactive fallout:

> Fallout shelters could readily be improvised for the rural population, because most existing structures are built with thick earth and timber walls, and with small windows and doors.[61]

However, while ample details of the Soviet training programs are available,[62] there has been no sign so far of a mass education program to train the peasantry in such steps. On the contrary, training in the countryside is being conducted in terms of refuge in trenches and dugouts, and not inside buildings.[63]

CIVIL DEFENSE OPERATIONS

General

Civil defense measures prescribed in Soviet publications are in large part those that one would expect in view of the weapons against which Soviet civil defense is oriented. A Western authority has pointed out that, in a number of instances, Soviet instructions closely parallel statements in Western manuals.[64]

However, there may be some types of equipment available which have not been publicized by the Soviets. This is hinted at by the following cryptic passage published in 1958, which implies that some equipment is to be kept under wraps until war actually breaks out:

> * * * The supplying [of the civil defense system] with materials and equipment cannot be carried out completely in advance, since improvements are continually taking place in equipment, machines, apparatus, means of communication and reconnaissance, etc. Thus, part of the most advanced equipment, for reasons of the security of atomic defense, may become available only when military operations begin. It would be inexpedient to discuss this measure in the present book.[65]

The "Alert"

The first step in setting the civil defense system into operation is the announcement of a state of "Alert" [66] by the Civil Defense Chief of the city, province, or republic.[67] This is proclaimed "in all the areas of the country which may be subject to attack by aircraft, guided missiles, or long-range rockets." [68] It is followed by the issu-

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[60] Gvozdev, M., and V. IAkovkin, op. cit., p. 159.
[61] Rand Corp., op. cit., p. 41.
[62] Cf. p. 96 ff.
[63] Cf. Voennye znaniia, 1958, No. 11, p. 25; also, ibid., 1957, No. 2, p. 22.
[64] Schützsack, Hugo. Die Zivilverteidigung hinter dem Eisernen Vorhang. In Ziviler Luftschutz, vol. 21, No. 4, April 1957, p. 92.
[65] Gvozdev, M., and V. IAkovkin, Atomnoe oruzhie i protivoatomnaia zashchita, 2d ed., revised and enlarged, Moscow, 1958, p. 156.
[66] Ugrozhaemoe polozhenie; literally, "state of emergency."
[67] DOSAAF. Uchebnoe posobie po MPVO. Moscow, 1956, p. 85.
[68] Gvozdev, M., and V. IAkovkin, op. cit., p. 165.

ance of regulations by the city government describing the tasks assigned to the civilian population; these are read over the radio and issued in printed form.[69]

The measures which then have to be taken are numerous. The personnel of the various civil defense organizations must be rounded up, assigned to their posts, and furnished with the necessary equipment. The uniformed troops likewise have to be mobilized, issued uniforms, and sent to their assigned positions. Work has to be undertaken to clear the air raid shelters of goods [70] (probably such as coal, potatoes, furniture, etc.) and to put them into a state of readiness. In many cases, this would involve cementing openings which have been made in the walls or the roofs since the last war, and the installation of ventilation and filtration equipment.[71] For those persons who cannot be accommodated in shelters or elsewhere, trenches must be dug.[72] These trenches are supposed to be over 6½ feet deep; their sides are to be reinforced with logs, planks or steel plates,[73] which must be ordered, delivered and installed. The trenches must then be covered with roofs, on which a layer of clay and earth must be placed. This would doubtless be a laborious and time-consuming operation, especially when trenches must be dug for thousands of people. The Soviets still have an acute shortage of mechanical equipment; indeed, illustrations in Soviet civil defense books show such trenches being dug by women using only shovels.[74]

The regulations further provide that stores of inflammable substances must be removed to safe places, that exposed wooden parts of buildings be painted with special chemicals,[75] and that windows be covered with white paint or whitewash to reduce the initial radiation from atomic bombs.[76] Furthermore, "wooden fences, barns, sheds, and other structures of little value are to be torn down. The same applies to scaffolding of combustible materials at construction sites." [77]

The Soviet citizen is further required to pack away all easily inflammable materials, such as curtains, clothing, paper, books, etc. Attics and hallways of buildings are to be cleared of all personal effects or other objects. Floors of attics in certain cases are to be covered with a layer of sand 2 to 4 inches deep as a measure against incendiary bombs.[78] Gas masks, if available, are to be issued to the population.[79]

The evacuation of children and other people not able to work has to be organized, transportation provided, and the movement actually carried out.[80]

On top of these and numerous other assignments, citizens are required to take all blackout measures necessary by nightfall of the

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[69] Zapol'skii, G. N., and others. Sredstva i sposoby protivovozdushnoi oborony naseleniia. Moscow, 1958, p. 16; Gvozdev, M., and V. IAkovkin, op. cit., p. 183.
[70] DOSAAF, op. cit., p. 55.
[71] Cf. Za oboronu, 1947, No. 4, p. 21.
[72] DOSAAF, op. cit., p. 55.
[73] Ibid., p. 73.
[74] DOSAAF. Pamiatka naseleniiu po zashchite ot atomnogo, khimicheskogo i bakteriologicheskogo oruzhiia. Moscow, 1957, p. 34.
[75] DOSAAF. Uchebnoe posobie po MPVO. Moscow, 1956, pp. 164–165.
[76] Gvozdev, M. M., and V. A. IAkovkin. Atomnoe oruzhie i protivoatomnaia zashchita. Moscow, 1956, pp. 142–144.
[77] DOSAAF, op. cit., p. 165.
[78] Ibid., p. 164.
[79] Gvozdev, M., and V. IAkovkin. Atomnoe oruzhie i protivoatomnaia zashchita. 2d ed., revised and enlarged. Moscow, 1958, p. 183.
[80] Ibid., pp. 159, 236.

day on which the "Alert" is announced.[81] This is to include the installation of special curtains, boards, etc., in windows.[82]

The postponement of many of the preparations until the "Alert" is admittedly a result of practical considerations. Thus, the reason why trenches are not dug in peacetime is explained as follows:

> Earth shelters are dug only upon the introduction of the "Alert," since their cost is high and if they are constructed ahead of time they quickly become useless.[83]

The time that such preparations would require has recently become a matter of concern to the Soviet authorities, who are now encouraging the completion of some measures in peacetime.[84] However, few details have yet been published on this point.

Blackouts, Camouflage, Fire Prevention

When an "Alert" is announced, "dimouts" are to be put into effect in certain areas less likely to be subject to air attack; shaded street lights may be used, for example, though windows of buildings must be completely covered. "Blackouts" are required where the danger of bombardment is greater; shaded street lights are prohibited and other rules are stricter. "Dimouts" and "blackouts" continue until the likelihood of attack has passed.[85] Standard methods are employed, such as curtains for windows, shades on lights, devices added to automobile headlights, etc.[86]

Camouflage may also be a civil defense measure. The following is a description of methods used in the last war in one of the districts of Moscow:

> The first defense measure to be taken was that of camouflage. It was necessary, in addition to the nighttime blackout, to produce for defense purposes a new architectural appearance of the highways and streets, buildings, war plants, military installations, residential houses, etc. It was necessary to distort the lines, shapes, and sizes of buildings in such a way that the enemy fliers would lose their orientation and would not find the targets they sought. Artists and architects showed great ingenuity and creative initiative in the effort to disorient the Hitlerite flyers.
>
> Within a few days, the Leningrad Highway (the central street of the district) and the streets near it changed their appearance substantially and sometimes whimsically. On vacant land, structures sprang up with the appearance of factories and subsidiary buildings; the dark spots of burned-out structures appeared on the pediments of buildings, while ancient oak trees nearby were cut down and new paths were trampled out.
>
> Plywood barracks appeared along the whole highway, scattered in a pattern incomprehensible except to the initiated. At the fork of the Leningrad and Volokolamsk High-

[81] DOSAAF, op. cit., p. 55.
[82] Ibid., pp. 80–81.
[83] Gvozdev, M., and V, IAkovkin, op. ct., p. 165.
[84] Cf. p. 43 ff.
[85] DOSAAF, op. cit., pp. 77–78.
[86] Ibid., pp. 78–90.

> ways there stood in splendor "picturesque" lanes of fig trees, palms, firs, and other decorative plants—painted on screens.
>
> This work was completed within 4 or 5 days.[87]

The measures listed in Soviet publications against fire contain little that is unusual. Thus, when the "Alert" is announced, civil defense workers are expected to provide buckets, axes, fire extinguishers, etc., as well as supplies of water. Incendiary bombs are to be thrown into buckets of water, tossed off roofs into open areas, or, in some cases, buried in sand.[88]

Evacuation

One of the important measures to be taken after the "Alert" is a partial evacuation of persons from large cities. Although discussions of this topic had appeared in the Soviet press as far back as 1939,[89] the concept of evacuation was not accepted by the Soviet civil defense officials at that time. However, the penetration of the German Army deep into Soviet territory forced the Soviet authorities to take this step. In some cases, mass evacuations of cities were attempted as the German forces approached; a selective evacuation of Leningrad was carried out while it was under siege. Part of the children in Moscow were removed at the beginning of the war.[90]

At the end of hostilities, this procedure seems to have been dropped from civil defense planning, and does not appear to have been revived again until 1958.

The evacuation, as now planned, is to be limited to certain groups, such as children of nursery, kindergarten and school age, and persons unable to work. Victims of air raids may also be taken outside the city.

The responsibility for this operation does not rest with the individuals concerned, but with the Transportation Service [91] of the city civil defense system in cooperation with the Service for the Maintenance of Order and Public Safety [92] (the latter being based on the Police Department). The wording of the Russian text—"evacuation of establishments (nurseries, schools, kindergartens, etc.)" [93]—implies that such organizations are to be removed as a body, that the teachers and school officials go along, and that the parents play no role.

In self-defense groups, the Unit for Maintenance of Order and Guard Service has the following additional duty under the regulations issued in 1958:

> Provides assistance in the evacuation of invalids, aged individuals, and children, and keeps guard over the apartments of evacuated citizens.[94]

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[87] Mel'nik, E. V dni surovykh ispytanii: bol'sheviki Leningradskogo raiona v gody Velikoi Otechestvennoi voiny. [Moscow] 1947, p. 20.

[88] DOSAAF, op. cit., pp. 164–175. (British correspondent Alexander Werth tried in 1941 to convince the Soviet authorities that water should not be used to douse incendiary bombs, but he was unsuccessful. Cf. his Moscow diary. New York, 1942, p. 75.)

[89] Vestnik protivovozdushnoi oborony, 1939, No. 1, p. 48.

[90] Cf. Lorimer, Frank. The population of the Soviet Union: history and prospects. Geneva, League of Nations, 1946, pp. 195–197; Gouré, Leon. Soviet administrative controls during the siege of Leningrad. Santa Monica, Rand Corporation, 1958 (RM–2075), p. 20; Bourke-White, Margaret. Shooting the Russian war. New York, 1942, pp. 64, 81.

[91] Gvozdev, M., and V. IAkovkin, op. cit., p. 159.

[92] Ibid., p. 236.

[93] Ibid., p. 159.

[94] Voennye znaniia, 1958, No. 11, p. 23.

Likewise, the Medical Unit of such groups:

> Provides assistance in the evacuation of the population, and particularly sick persons and invalids.[95]

The persons evacuated are to be settled in country areas. Thus, the civil defense preparations to be taken in villages include the following:

> In rural areas when the "Alert" is introduced, there are organized * * * the reception and the quartering of and work arrangements for the urban population evacuated into rural areas.[96]

Air Raid Warnings

If the approach of enemy aircraft is detected, the air raid warning service of the Army (VNOS) [97] notifies the city civil defense staff, which announces an "Alarm." [98] The signal is to be given by the blowing of whistles and sirens of factories, locomotives, steamships, etc., for 2 or 3 minutes. The announcement is also to be made over the radio and the loudspeaker network; the latter is often citywide in the Soviet Union and includes outlets in individual apartments. The prescribed text for announcing the "Alarm" is as follows:

> Attention! This is the city civil defense staff speaking. Citizens, an air raid alarm is announced!
> Air raid alarm! Air raid alarm!
> Go quietly to the shelters, do not forget to turn out the light, gas, and electric heating equipment, put out the fire in the stove!
> Air raid alarm![99]

Individuals are then supposed to proceed to the shelters and, according to the manuals (though it is not mentioned in the announcement), to bring gas masks. If citizens are at home, they are also to take along supplies of water and food, as well as their "documents." [1]

Another signal, "Chemical attack," [2] is to be given if evidence of the use of chemical, radioactive, or certain types of biological weapons is reported after a raid has begun. Until 1954 this signal had been limited to chemical attack, but now its scope has been expanded to include the other two types (though the name of the signal has not been changed). Citizens are notified by radio and by the banging of gongs or pieces of rail hung on wires. Persons who are not in hermetically sealed shelters are supposed to go to shelters providing such protection, or else they are supposed to don gas masks.[3]

The "All clear" is given only over the radio or loudspeaker network.[4] Some current sources also mentioned a fifth signal,[5] "Chemical attack all clear," [6] which is presumably also given by radio or loudspeaker.

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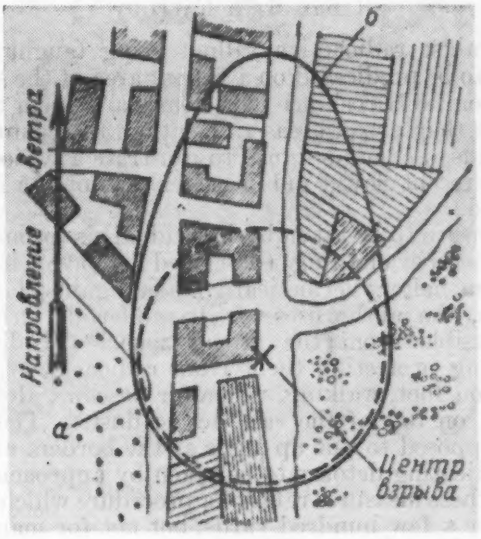
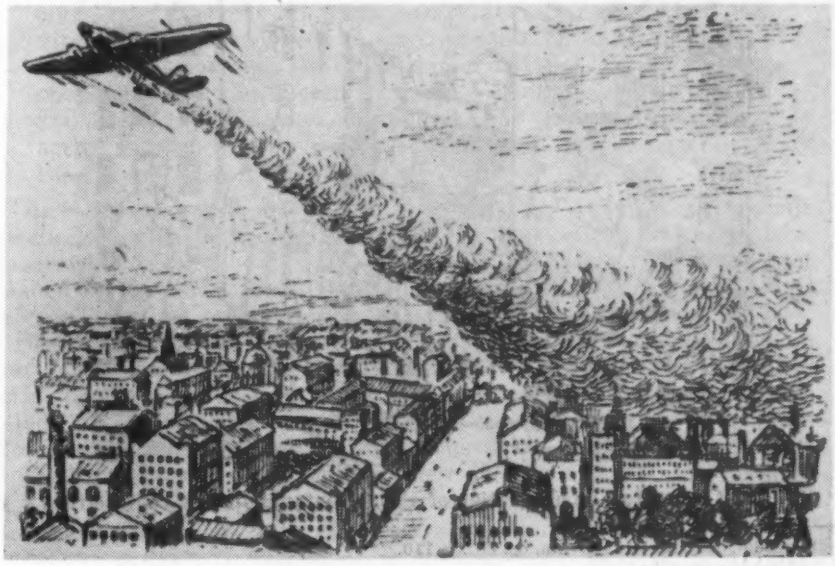
[95] Ibid.
[96] Ibid., 1958, No. 9, p. 30.
[97] Sluzhba vozdushnogo nabliudeniia, opoveshcheniia i sviazi (Air Observation, Notification and Communication Service). (Bol'shaia sovetskaia entsiklopediia. 2d ed., vol. 8. Moscow, 1951, p. 295.)
[98] Vozdushnaia trevoga; literally, "Air Alarm."
[99] Zapol'skii, G. N., and others, op. cit., p. 16.
[1] Gvozdev, M., and V. IAkovkin, op. cit., p. 184.
[2] Khimicheskoe napadenie.
[3] DOSAAF, op. cit., p. 57.
[4] Ibid. (otboi vozdushnoi trevogi).
[5] Voennye znaniia, 1958, No. 6, p. 14.
[6] Otboi khimicheskogo napadeniia.



13. Soviet concept of fallout areas from an atomic bomb (1958). The "X" represents ground zero; the broken line, the fallout area if there is no wind; and the solid line, the fallout area if the wind is blowing in the direction indicated by the arrow. Soviet civil defense instructions are based on fallout areas covering a few blocks, as shown in this diagram.



14. Soviet concept of a hypothetical biological attack, with the germs being sprayed from an aircraft.

Radioactive Fallout

Measures against radioactive fallout being taught in the Soviet Union appear to be predicated on a fallout area of the size that would be expected from a Hiroshima-type bomb, and seem to be based on the assumption that urban areas rather than the countryside will be concerned. Thus, a chart designed to illustrate a typical fallout zone appearing in a recent Soviet publication shows only a few city blocks as being affected.[7]

The first measure to be taken by individuals is to put on gas masks and other protective clothing (described on p. 88 ff), unless they happen to be in shelters hermetically sealed against fallout.[8]

Furthermore, the authorities are to undertake "the most rapid evacuation possible from the attack zone."[9] Individuals, after donning clothing protecting them from radioactivity, are to be led from the area on foot, walking, whenever possible, along boards laid on the ground on top of the radioactive dust.[10] The civil defense workers are supposed to put up signs at the borders of the contaminated zone, indicating detours to be taken by approaching vehicles.[11] Obviously, all these measures refer to a procedure which would be easy to carry out for a few hundred yards, but not for many miles.

Other instructions also show how Soviet procedures are still geared to a small fallout area:

15. Soviet concept of an evacuation of a zone contaminated by radioactivity.

[7] Gvozdev, M., and V. IAkovkin, op. cit., p. 110.
[8] DOSAAF, op. cit., p. 57.
[9] DOSAAF, op. cit., p. 152.
[10] DOSAAF. Pamiatka naseleniiu po zashchite ot atomnogo, khimicheskogo i bakteriologicheskogo oruzhiia. Moscow, 1957, p. 57.
[11] Neiman, M. B., and K. M. Sadilenko. Termoiadernoe oruzhie. Moscow, 1958, p. 184.

16. Laying boards over radioactive dust prior to the evacuation of the shelter shown in the background.

> After an atomic attack, the population must leave the contamination zone as soon as possible. This does not mean that one must run, causing panic. * * * Leaving the contamination zone must be done only in the directions determined by the civil defense units and by the paths established by the civil defense. * * * If passageways are not cleared and no direction signs have been put up, one should go in the direction where there is the least damage. * * * While one is crossing the contaminated section, one must wear gas masks and cloaks. * * * As soon as one has left the zone, the radioactive substances which have settled on the exposed areas of the body must be immediately removed.[12]

Upon reaching the borders of the contamination zone, individuals are checked with dosimeters to see if they have accumulated dangerous radioactivity. If they have, they are supposed to have the dust washed off in public baths (common in the U.S.S.R.), special civil defense buildings, or in portable tents.[13]

If it is found that radiation in the zone exceeds one roentgen an hour, areas in it are to be decontaminated.[14] In some cases, the radioactive dust may be washed away. If the surface of snow is contaminated, it can be removed by shoveling; the same is true of ground, though this would mean more strenuous work. Special attachments to trucks and other equipment are described in the training manual, as well as portable apparatus for decontaminating walls.[15]

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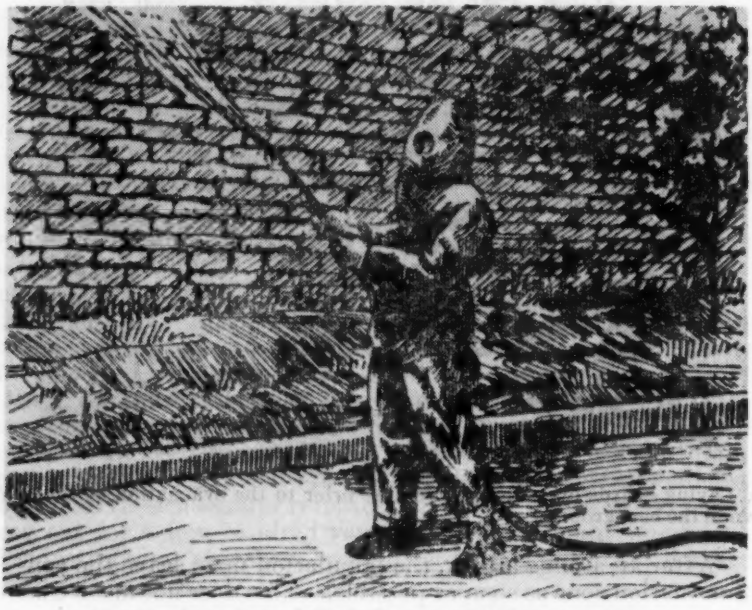
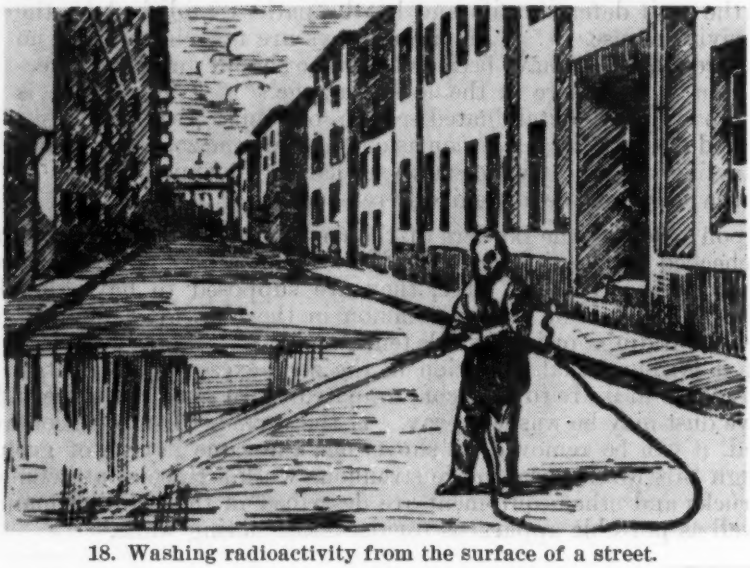
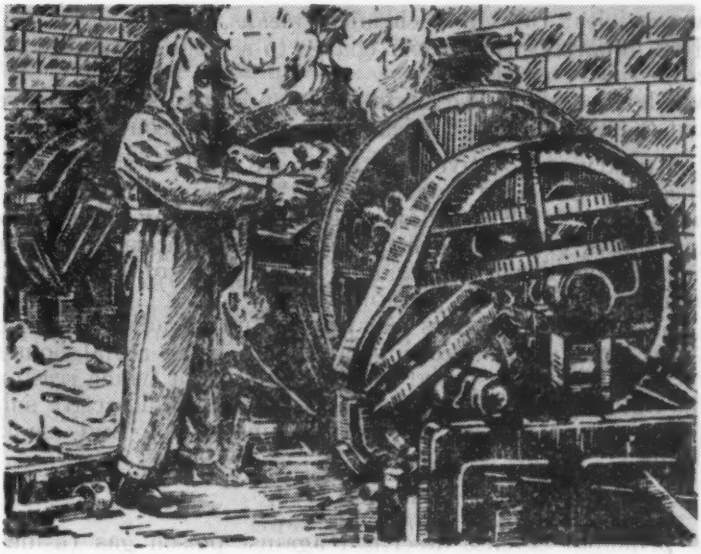
[12] Gvozdev, M., and V. IAkovkin, op. cit., pp. 219–221.
[13] DOSAAF. Uchebnoe posobie po MPVO. Moscow, 1956, pp. 124–125; Zapol'skii, G. N., and others, op. cit., p. 32.
[14] Gvozdev, M., and V. IAkovkin. Atomnoe oruzhie i protivoatomnaia zashchita. Moscow, 1956, p. 166.
[15] DOSAAF, op. cit., p. 111–120.



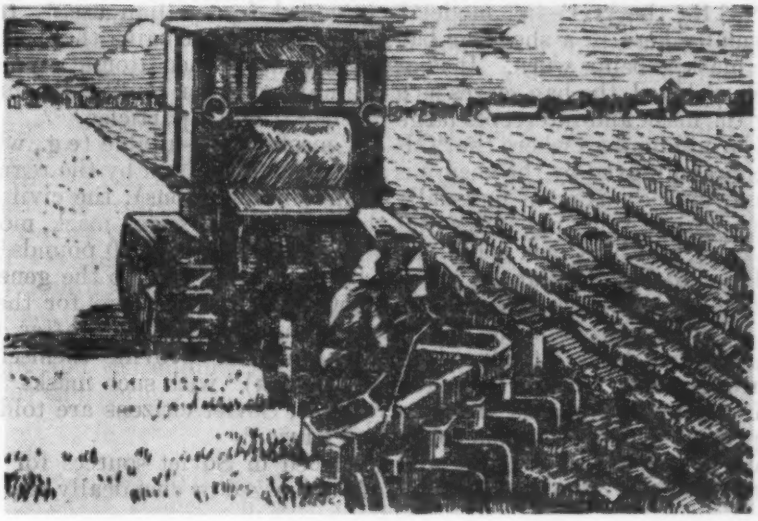
17. Removing radioactivity from walls by sandblasting.



18. Washing radioactivity from the surface of a street.



19. Washing radioactivity out of clothing in a laundry.



20. Ploughing radioactive dust under the surface of the ground.

While chemicals as such cannot neutralize radioactivity, they may be used to loosen the radioactive dust from walls and other surfaces. Soviet sources mention three groups of such chemicals: (1) Colloid substances, with surface-active properties which enable them to penetrate the interstices and fissures of walls as well as the radioactive particles themselves, thereby facilitating their removal; (2) absorbing substances, such as amorphous precipitates, which absorb the radio-

active particles; (3) electrochemical means, the action of which is based on imparting the proper charge to a metallic surface to repel the radioactive particles.[16]

Civil defense plans also envisage defense against radioactive dust without the explosion of nuclear weapons. One source states:

> Military radioactive substances are used in the form of specially prepared mixtures * * * containing radioactive isotopes. * * * The radioactive substances may be dissolved in liquids, or else use may be made of materials such as metallic powder or fine sand, upon the grains of which radioactive salts have been precipitated.
>
> Liquids and powders carrying military radioactive substances may be loaded into artillery shells, aerial bombs, rockets, mines, or special aviation equipment which scatters the military radioactive substances. * * * Radioactive substances may further be used in incendiary and smoke bombs.[17]

Poison Gas

The principal defense described against poison gas (aside from hermetically sealed air-raid shelters) consists of individual gas masks.[18] While various types of masks are reported available in the U.S.S.R., the "GP–4u" model is intended for civilian use.[19] It is normally kept in a shoulder bag, and the filter remains there while the mask is being worn. It is explained that "when atomic weapons are employed, the bag serves as a preliminary filter for the air entering the mask and intercepts large radioactive dust particles." [20]

For use in cases where the "GP–4u" mask is not suitable (e.g., when the gas employed by the enemy is inadequately filtered by the regular mask, or the gas is in unusually high concentrations), the civil defense training manual states that there exists an oxygen mask, model "KIP–5," with oxygen containers and weighing about 20 pounds.[21]

Prior to World War II, gas masks were being sold to the general public, and workers were being encouraged to buy them for themselves and their families. Present plans provide that, after the "Alert" has been introduced, civilians are to "provide themselves (through their housing managers or at work)" with such masks.[22]

If regular gas masks are not available, Soviet citizens are told to improvise such masks from cotton and gauze.[23]

Various types of clothing are described in Soviet sources for use in the event of gas attack. Made of rubberized or chemically treated

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[16] Gvozdev, M., and V. IAkovkin. Atomnoe oruzhie i protivoatomnaia zashchita. 2d ed., revised and enlarged. Moscow, 1958, pp. 222–223.

[17] Gvozdev, M., and V. IAkovkin. Atomnoe oruzhie i protivoatomnaia zashchita. Moscow, 1956, pp. 87–88.

[18] DOSAAF, op. cit., p. 91.

[19] Gvozdev, M., and V. IAkovkin. Atomnoe oruzhie i protivoatomnaia zashchita. 2d ed., revised and enlarged. Moscow, 1958, p. 215. (The initials mean "Civilian gas mask, type 4, improved." 1956 publications describe the mask as merely a "GP–4." The new model appears to have become available in 1957; the improvements were in the design of the filter and the composition of the activated carbon. Cf. Levin, M. E., and others. Zashchita ot sredstv massovogo porazheniia. Moscow, 1958, p. 78.)

[20] DOSAAF, op. cit., p. 93.

[21] Ibid., pp. 99–100.

[22] Gvozdev, M., and V. IAkovkin, op. cit., p. 183. (Gas masks were reported to have been still on sale in 1951. Cf. Savitskii, I. I. MPVO zhilogo doma. 2d revised ed., Moscow, 1951, p. 27.)

[23] Levin, M. E., and others, op. cit. (footnote 19), p. 112.

cloth, they vary from aprons and cloaks to sets of clothing designed to isolate the wearer completely from the surrounding air. Being airtight, the latter accumulates heat and therefore cannot be worn for more than a quarter or half and hour if the atmosphere is warm, unless the wearer undergoes periodic spraying with water.[24] If such elaborate clothing is not available, it is claimed that ordinary heavy clothing, tightly buttoned, is effective against toxic substances for short periods (5 to 10 minutes).[25]

The Soviet civil defense training manual also provides for neutralizing the poison gas contamination of ground and buildings. Sometimes, it says, the gas will evaporate by itself and no action is necessary except to rope off the area. In other cases, it has to be removed, using equipment similar to that employed for radioactive contamination. However, in contrast to fallout, some types of chemicals can be neutralized by substances such as lime, ashes, etc.[26]

Soviet civil defense workers have been warned to watch for "evidence of the use of chemical weapons by the enemy (especially during the period prior to air attack, through sabotage)." [27]

Biological Warfare

In describing biological warfare, the Soviet civil defense training manual (stating that all its information is based on Western sources), lists, among others, the following diseases which may break out after such attack: the plague, anthrax, rabbit fever, brucellosis, glanders, cholera, psittacosis, and encephalitis. It also states that the germs causing such diseases may be scattered by special bombs, boxes or bags; boxes with infected insects or rodents may be dropped from aircraft, or else germs may be sprayed from planes by special equipment. "The enemy," the manual adds, "may use various sabotage methods in distributing germs." [28]

Soviet civil defense plans against such warfare include the use of various well-known vaccines, antitoxins, serums, bacteriophages, antibiotics, and other medical preparations.[29] Other methods include the disinfection of objects by boiling and the use of chemicals, the extermination of germ-carrying insects with chemicals or heated air, and the elimination of rats and other rodents which might be carrying germs.[30]

First Aid

The Soviet civil defense training manual outlines first-aid methods studied in connection with civil defense courses. Descriptions are given of treatment for burns, shock, drowning, electric shock, and other injuries; the procedures generally appear to be conventional.[31] Treatment in case of chemical or biological attack includes the washing or powdering of the body with certain chemicals, the administration of medicines, etc.[32]

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[24] DOSAAF, op. cit., pp. 100–103.
[25] Ibid., pp. 104–105.
[26] Ibid., pp. 111–120.
[27] Voennye znaniia, 1958, No. 11, p. 23.
[28] DOSAAF, op. cit., p. 41.
[29] Ibid., pp. 105–106.
[30] Ibid., pp. 127–128.
[31] Ibid., pp. 155–159.
[32] Ibid., pp. 152–155.

Veterinary aid for cattle suffering as a result of air raids is also prescribed. Measures are outlined for treating wounds, bruises, fractures, burns, injuries inflicted by poison gas and radioactive substances, and the consequences of biological warfare.[33]

AVAILABILITY OF EQUIPMENT AND FACILITIES

Gas Masks

Since Soviet civil defense plans rely heavily on the use of gas masks, the actual availability of such equipment is important. However, no claim has been noted in Soviet publications that masks are available for the entire population, or even a substantial part of it.

In peacetime, the greatest demand for gas masks is, of course, in connection with training, where a single mask can be used successively by a number of persons. However, it is clear that there are not enough masks even for this purpose. Thus, the first vice president of the DOSAAF admitted as late as November, 1958:

> One of the reasons lowering the quality of mass training in civil defense is the insufficiency of gas masks and other individual chemical defense means.[34]

Availability of Shelters During World War II

During World War II, the city of Moscow, with its political and economic significance, was a prime bombing target. While no clear-cut shelter statistics have been located in Soviet publications for the city as a whole, we do have them for one important industrial district in the city. These figures show that space in regular reinforced shelters was available for only 11 percent of the district's population, and that only a third of such shelter space provided protection against gas attack. About 37 percent of the residents of the district were able to take refuge in subway tunnels. The majority (52 percent) was obliged to seek shelter in trenches dug in parks or other open areas.[35]

No statistics on shelters in other Soviet cities during World War II have been located.

Shelters at Present

What has happened to the shelters that existed in the city of Moscow during the war? It is known that the trenches were soon filled in. In regard to the reinforced shelters, a 1947 article states:

> At the present time, the great majority of the shelters has been dismantled and turned over for the economic use of civilian organizations.[36]

Usually, the article continued, the shelters were being employed for storage purposes, since this could be done without extensive remodeling; all that was needed was to install trap doors. In many

[33] Ibid., pp. 160–164.
[34] Sovetskii patriot, Nov. 30, 1958, p. 2.
[35] Mel'nik, E. V dni surovykh ispytanii; bol'sheviki Leningradskogo raiona Moskvy v gody Velikoi Otechestvennoi voiny. Moscow, 1947, p. 21. (The district referred to is the Leningradskii raion, with 175,000 persons then either living or working in the area. The exact figures for shelter capacity are given as: gas-proof reinforced shelters, 6,115; other reinforced shelters, 13,190; subway tunnels, 65,000; trenches, 89,940; total, 174,245.)
[36] Za oboronu, 1947, No. 4, p. 21.

cases, the shelters were converted into offices, used for recreational or educational purposes, or even employed for production; in such instances, openings for windows had to be cut in the shelter wall. "In all these cases," the article adds, "it proved necessary to remove the reinforcements and to dismantle the filtration and ventilation equipment." [37]

That the practice of using shelters for other purposes was continuing as late as 1957 is confirmed by a civil defense publication of that year:

> As soon as the "Alert" is announced, all shelters used for cultural or practical needs are immediately cleared and are prepared for their primary purpose. Control over the fulfillment of these measures is maintained by the civil defense staff of the city or district.[38]

That shelters are not kept in constant readiness is also borne out by the recent report of an American correspondent in Moscow that "there are no sirens blaring alarms for mock raids to practice civil defense operations." [39] Obviously, if the population has been trained to take refuge in specially prepared shelters, and if the reinforced shelters are now used for storage and the trenches have not been dug, there would be no shelters for the population to use if a mock air raid were staged.

The same correspondent looked for indications of the availability of air raid shelters in Moscow. He reported:

> Search carefully through this Soviet metropolis of more than 6 million persons, and you might find a sign pointing to an air raid shelter. But it looks more like a hangover from World War II. * * *
>
> There is an air raid shelter sign, but probably no shelter to go with it. Not far from Spasso House, official residence of U.S. Ambassador Llewellyn Thompson, it shows dimly on a building wall. Those who first noticed it said apparently it had been there since the war.[40]

As shown in the preceding section, during World War II, regular shelters were available for relatively few persons in Moscow. The question then arises—how many additional shelters have been built in the city since, either in new buildings or in houses previously erected? No conclusive information has been found on this point. No specific claims that shelters have been built extensively has been noted in the Soviet press. The civil defense authorities have had a voice in approving construction plans for buildings (as explained on p. 63 ff.), but the effectiveness of this participation is not clear from the data available.

The only evidence found concerning the availability of shelters in cities other than Moscow was published in connection with the civil

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[37] Ibid.
[38] Miroshnikov, I. Kollektivnye sredstva protivoatomnoi zashchity. Moscow, 1957, p. 35. (Cf. also DOSAAF. Uchebnoe posobie po MPVO. Moscow, 1956, p. 55.)
[39] Christian Science Monitor, printing an Associated Press dispatch, Aug. 15, 1958.
[40] Ibid.

defense training program. The instructions for the current civil defense course include the statement:

> It is recommended that this lesson be conducted on a practical basis, in one of the nearest shelters.[41]

However, it is clear that the DOSAAF officials have had difficulty in meeting this requirement. In some cases, they have found it necessary to build their own shelters.[42] But even so, there are admittedly still not enough. As late as last November, a high DOSAAF official was obliged to state:

> In many organizations of the society there are lacking * * * reinforced shelters, earth shelters, trenches, etc.[43]

As far as rural areas are concerned, Soviet sources imply that the construction of reinforced shelters is not even contemplated (except possibly in connection with important plants located outside cities). Thus, one writer states that the construction of shelters is limited to "cities and industrial enterprises" because of the factors of "expense, materials, and, most important, time." [44] The table of organization for urban self-defense groups calls for the establishment of a "Shelter Unit," [45] while no such unit is included in rural groups.[46]

Though only earth shelters are needed in the country for training, the DOSAAF is here again running into difficulties. That such trenches are provided only by the efforts of the DOSAAF itself is indicated by the following:

> The experience of the best DOSAAF organizations proves that, if there is initiative and persistence, trenches for teaching purposes can be dug in every inhabited locality [in the countryside].[47]

Glimpses of the progress of civil defense preparations in the countryside are often given in articles in Soviet magazines and newspapers. For instance, in the Novo-Moskovsk District in the Ukraine, the Shchors Collective Farm is reported to have made fine progress in training, and "every collective farmworker knows his responsibilities in the event of an 'Alert.'" In fact, it is said that "many collective farmworkers have prepared shelters of the simplest type" [48] (i.e., roofed trenches or tunnels), though other Soviet authorities, as noted above, do not recommend that such trenches be dug ahead of time.

On the other hand, in the neighboring village of Nikolaevskoe, "barely a third of the inhabitants have studied in civil defense classes." The heads of the governments of this and another village are quoted as saying frankly: "The preparation of the population for civil defense is no business of ours." [49] Thus apparently no shelters have been built in this locality.

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[41] Voennye znaniia, 1958, No. 5, p. 34.
[42] Sovetskii patriot, Dec. 14, 1958, p. 3.
[43] Ibid., Nov. 30, 1958, p. 2.
[44] Ibid., Oct. 8, 1958, p. 2.
[45] Voennye znaniia, 1956, No. 3, p. 18.
[46] Ibid.; also, ibid., 1957, No. 2, p. 22.
[47] Ibid., 1958, No. 10, p. 33.
[48] Ibid., 1958, No. 11, p. 25.
[49] Ibid.

Shelter Capacity of Subways

Subways exist at present only in the two largest Soviet cities—Moscow and Leningrad—although a third is under construction in Kiev.[50]

The number of persons who could take refuge in the Moscow subway has not been revealed in the Soviet publications examined; however, it may be possible to arrive at a rough approximation.

The Moscow subway in the middle of 1958 had about 66 kilometers [51] (or about 40 miles) of double track in operation, each track having its own tunnel. (The subway system, it may be added, is continuing to expand; more trackage was put into operation later in 1958,[52] and the plans for 1959 to 1965 call for the construction of an additional 30 kilometers.[53] The Moscow subway system is visualized as eventually totaling 200 kilometers.)[54]

To the figure for subway tunnels in operation, one should perhaps add about 4.5 kilometers [55] for a tunnel abandoned in April 1953. It was known as the "Arbat radius" and extended from a point west of Revolution Place to the Kiev Station. A new tunnel, paralleling the abandoned one, was opened at that time.[56] The new tunnel is dug at considerable depth, and runs slightly north of the older one at some points and south of it at others. It appears to be the tunnel referred to in the New York Times of September 30, 1954 (p. 33) and described as having been "recently completed," as having "no transport purpose, merely paralleling existing lines," and as constituting "undoubtedly the world's largest and safest air raid shelter."

In addition to the tunnels now and formerly in use, one should add trackage used for the temporary parking of trains, tunnels completed but not yet in operation, etc. A guess of about five kilometers for such tunnels may be reasonable; this would result in an approximation of 75 kilometers for the whole system in the middle of 1958.

Since the roadbed is approximately 12.1 feet wide,[57] one then arrives at a figure of about 5,950,000 square feet of space in the Moscow tunnels.[58] To this should be added the area available in the stations; this is a difficult figure to estimate, but may be of the order of 1,600,000 square feet; [59] thus the total for the whole Moscow subway system would be roughly 7,500,000 square feet.

Estimates of the area required for each person vary from 5 square feet (used in Europe for shelters designed for short-term occupancy)

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[50] Izvestiia, Feb. 20, 1958, p. 1.

[51] This figure is obtained by taking the estimate of "slightly over 60" given in a 1957 source (Emel'ianov, O., and L. Karpukhin. Moskovskii metropoliten. [Moscow] 1957, p. 28) and adding 5.4 kilometers for the "Riga radius," opened on May 1, 1958. (Izvestiia, Apr. 30, 1958, p. 3.)

[52] E.g., Izvestiia, Nov. 4, 1958, p. 4.

[53] New York Times, Jan. 18, 1959, section I, p. 4.

[54] Emel'ianov, O., and L. Karpukhin, op. cit., p. 28.

[55] This is the length given for the tunnel replacing it. (Pravda, Apr. 5, 1953, p. 1.)

[56] Cf. Moskovskii metropoliten. Moscow, 1953, p. [21].

[57] Derived from the drawing on page 29 of: Moscow. Upravlenie Moskovskogo metropolitena. Sluzhba putei i sooruzhenii. Ustroistvo i soderzhanie puti Metropolitena im. L. M. Kaganovicha. Moscow, 1943.

[58] Allowing for the fact that the tracks are double.

[59] The first stations to be built had platforms ranging from about 20,000 to 30,000 square feet; later stations appear to be larger, with the biggest having three halls, one of which contains 19,000 square feet. (Ryzhkov, K. Moskovskii metropoliten. [Moscow] 1954, p. 30.) For our estimate, a figure of 30,000 was assumed as the average size, and multiplied by 47, the number of stations in the subway. (Emel'ianov, O., and L. Karpukhin. Op. cit., pp. 51–54, gives 43 as the number of stations; 4 more were added in the "Riga radius.")

to 20 square feet (estimated for American shelters intended for long-range use.)[60] These figures, applied to the area available in Moscow subways, result in a maximum estimate of 1,500,000 persons, and a minimum of 375,000. The first figure is probably too high, since it assumes extreme crowding, short-term occupancy, and a very high efficiency in the utilization of space. The second figure, in turn, is probably too low.

Another method which may be used to calculate the subway's capacity is based on experience during World War II. In one city district in Moscow, 65,000 persons used the subway as a shelter during air raids.[61] The length of the subway in the district was almost exactly 5 kilometers,[62] resulting in an average of 13,000 persons per kilometer.[63] Taking the 1958 figure of 75 kilometers as the length of the Moscow subway, one obtains a figure of 955,000 persons.

Thus, it seems possible to assume an estimate somewhere in the vicinity of 1 million as the 1958 shelter capacity of the Moscow subway. Such an estimate appears to be supported by the remark of a Soviet writer that persons taking refuge in Moscow subways during World War II were in the "hundreds of thousands."[64] Allowing for the growth of the subway system since the war, this would agree with the order of magnitude suggested above.[65]

Since the population of Moscow in 1956, excluding the suburbs, was 4,839,000,[66] and if an allowance is made for the growth of the population between 1956 and 1959, such an estimate would indicate that about four-fifths of the inhabitants of Moscow would have to seek shelter elsewhere than in the subway.

The depth at which a subway is laid is important in evaluating its usefulness for civil defense. The Moscow subway at some points runs just below the surface,[67] and in at least one place is in the open, occupying part of a bridge across the Moscow River.[68] On the other hand, some sections of the subway are reported as being over 130 feet deep.[69]

While shelters at such depths would presumably provide some protection against nuclear bombs, they would clearly be inadequate against direct hits of hydrogen weapons. Thus, designs by an American engineering firm for shelters providing protection against hydrogen attack call for shelters 800 feet below the surface.[70] The specifications also call for such shelters being dug into rock; much, if not all, of the Moscow subway is tunnelled into earth or clay.

The subway in Leningrad is still in the early stages of construction. The first section was opened in November 1955;[71] in 1958 the subway

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[60] Rand Corp. Report on a study on nonmilitary defense. [Santa Monica], 1958, pp. 6–7.
[61] Mel'nik, E., op. cit., p. 21.
[62] Cf. map of Moscow in Bolshoi sovetskii atlas mira. Vol. 2, Moscow, 1939.
[63] Persons at stations are included in this figure.
[64] Za oboronu, 1946, No. 15, p. 6.
[65] By the end of World War II, the tunnels in operation in Moscow totaled about 40 kilometers. (Cf. Kattsen, I. E., and K. S. Ryzhkov. Moskovskii metropoliten. Moscow, 1948, p. 5.)
[66] Narodnoe khoziaistvo SSSR; statisticheskii sbornik. Moscow, 1956, p. 24.
[67] Kattsen, I. Metro Moskvy. [Moscow, 1947], p. 38.
[68] Izvestiia, Mar. 16, 1958, p. 4.
[69] Moskva. [Moscow] Molodaia gvardiia, 1948, p. 248. The figure is given as "over 40 meters."
[70] Rand Corp., op. cit., p. 7. (In World War II, several hundred people were killed by a direct hit on one Moscow subway station. Cf. Bourke-White, M. Shooting the Russian War. New York, 1942, p. 81.)
[71] Leningradskii metropoliten imeni V. I. Lenina. [Leningrad] 1956, p. 13, 231.

was about 14 kilometers (9 miles) long and had nine stations.[72] Its tunnels are somewhat smaller than those in Moscow, being 5.1 meters in diameter instead of 5.6.[73] Thus, its shelter capacity would be only about a fifth of that of the Moscow subway, or somewhere around 200,000. The population of Leningrad, excluding suburbs, was 2,814,000 in 1956.[74]

Evacuation Facilities

According to American estimates, the Soviet Union at the end of 1956 had the following pool of nonmilitary motor vehicles, both in the cities and in the country: 700,000 automobiles, 2,800,000 trucks, and 65,000 buses.[75] Soviet automobiles have a seating capacity ranging from four to six.[76] The average truck capacity in 1955 was 3.3 tons;[77] Soviet estimates for military purposes report that a truck of 3.0 to 3.5 tons, with proper adaptations, would be able to transport 25 to 30 persons.[78] The most common type of bus in the U.S.S.R. is the ZIL–155,[79] with a capacity of 52 persons.[80] [81]

One of the key elements in a mass evacuation is the time factor; should several days be available for such an operation, a relatively limited amount of transportation, supplemented by vehicles brought in for the purpose, would be able to remove a substantial number of people. An evacuation on a few hours' notice, on the other hand, might present considerable difficulties. Consequently, any estimate of the ability of the Soviets to carry out a partial or complete evacuation would depend on what circumstances are assumed.

The number of vehicles available for transportation may be limited by other considerations; thus, in World War II, public transportation buses in Moscow and Leningrad were taken off their routes and used for military purposes.[82]

The efficiency shown in the organization of the evacuation and in the use of the available equipment is also a factor. Since 1951, a drive has been underway in the larger Soviet cities to centralize the control of transportation. The trucks formerly owned and operated by innumerable plants, warehouses, etc., have been gradually transferred to central trucking agencies performing the functions of common carriers.[83] Such centralization would doubtless facilitate a mass evacuation.

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[72] Pravda, June 1, 1958, p. 6.
[73] Leningradskii metropoliten imeni V. I. Lenina, p. 15.
[74] Narodnoe khoziaistvo SSSR; statisticheskii sbornik. Moscow, 1956, p. 24.
[75] Hunter, Holland. Soviet transportation; how it functions today. In: Automotive industries, vol. 118, No. 1, Jan. 1, 1958, p. 96.
[76] Schwalberg, Barney K. The Soviet automotive industry; a current assessment. In: Ibid., p. 67.
[77] Ibid., p. 65. (The figure is given as 3.6 short tons, which converts into 3.3 metric tons.)
[78] Bol'shaia sovetskaia entsiklopediia, 2d ed., vol. 13, Moscow, 1952, p. 113.
[79] Schwalberg, Barney K., op. cit., p. 68.
[80] Moskovskii avtomobil'nyi zavod. Katalog zapasnykh chastei gorodskikh avtobusov ZIL–155, ZIL–158, i turistskogo avtobusa ZIL–158A. Moscow, 1958, p. 7. (The capacity consists of 28 seated passengers, 22 standing passengers, the driver, and the conductor.)
[81] To provide a frame of reference, the following registration figures are given for private and commercial vehicles in the United States in 1956: 54,133,572 automobiles, 142,110 buses, and 10,161,737 trucks. To these should be added 775,091 publicly owned vehicles of various types. (World Almanac, 1958, p. 682.)
[82] Bus service was restored in Moscow in April 1945. (Durian, IA. M. Puti snizheniia sebestoimosti passazhirskikh avtoperevozok. Leningrad-Moscow, 1950, p. 9.)
[83] Cf. Avtomobil'nyi transport, 1956, No. 9, p. 4.

TRAINING

Soviet civil defense training can be divided into two basic types: (1) the training of the population as a whole in the fundamentals of civil defense and (2) the specialized training of the military and nonmilitary personnel enrolled in the civil defense system.

Training of the Population

Organization

The training of the Soviet public in civil defense fundamentals is the responsibility of the Volunteer Society for Assistance to the Army, Air Force, and Navy (usually known as DOSAAF).[84] However, the first aid aspects of civil defense training are taught by instructors provided by the Soviet Red Cross.

The DOSAAF, established in 1951, is the successor of a series of similar organizations dating back to 1920, of which the most important was the Osoaviakhim, which existed from 1927 to 1948.[85] The purpose of DOSAAF, which is closely associated with the Soviet Armed Forces and the MVD, is to provide the population with training not only in civil defense, but also in skills which may be of military value, such as radio engineering, gliding, parachute jumping, ship modeling, truck and motorcycle driving, marksmanship, and so forth. The society's work in civil defense is directed by its Administration of Air Defense and Technical Training,[86] which is subordinate to the Central Committee of the society.[87] The DOSAAF is organized on the territorial principle, and is composed of republican, provincial, and local organizations.

Training to 1955

The public has been trained in civil defense through a succession of courses, given primarily by instructors provided by the DOSAAF and revised over the years to reflect changes in military weapons and civil defense doctrine. Table 1 provides outlines of the courses as they were given at various dates up until 1955.

The first nationwide instruction was introduced on January 1, 1935.[88] It was divided into two parts, one a 20-hour course[89] for members of the Osoaviakhim,[90] leading to the award of the badge "Ready for Air and Chemical Defense, 1st Grade" (Gotov k PVKhO,

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[84] Dobrovol'noe obshchestvo sodeistviia armii, aviatsii i flotu. The full official name of the national organization is Vsesoiuznoe ordena Krasnogo Znameni dobrovol'noe obshchestvo sodeistviia armii, aviatsii i flotu (All-Union Voluntary Society for Assistance to the Army, Air Force and Navy, Awarded the Order of the Red Banner). (Cf. Knizhnaia letopis', 1957, No. 40911.)

[85] In 1920 the Military Scientific Society (Voenno-nauchnoe obshchestvo) was established in Moscow, and in 1924 there was organized, also in Moscow, the Society of Friends of Chemical Defense and Chemical Industry (Obshchestvo druzei khimicheskoi oborony i khimicheskoi promyshlennosti), the latter undertaking to train the civil population in chemical defense, since the military was not in a position to do so. Later, based on these and other organizations, there was established, in January 1927, the Union of Societies for Assistance in the Defense and in the Aviation and Chemical Progress of the U.S.S.R. (Soiuz obshchestv sodeistviia oborone i aviatsionnomu i khimicheskomu stroitel'stvu SSSR; abbreviated to Osoaviakhim). In May 1948 it was broken up into three organizations, the Volunteer Society for Assistance to the Army (Dobrovol'noe obshchestvo sodeistviia armii; Dosarm), the Volunteer Society for Assistance to the Air Force (Dobrovol'noe obshchestvo sodeistviia aviatsii; (Dosav), and the Volunteer Society for Assistance to the Navy (Dobrovol'noe obshchestvo sodeistviia flotu; Dosflot). On Aug. 20, 1951, these three organizations were merged into the DOSAAF. (Cf. Voennye znaniia, 1957, No. 1, pp. 7–10; Tekhnika i snabzhenie Krasnoi Armii, 1925, No. 181, p. 10.)

[86] Upravlenie PVO i tekhnicheskoi podgotovki.

[87] Voennye znaniia, 1958, No. 3, p. 2.

[88] Za oboronu, 1946, No. 1, p. 24.

[89] Tramm, B. Normy "Gotov k PVKhO" I i II stupeni. Moscow, 1936, p. 13.

[90] Ibid., p. 9.

1. stupeni). The second was a 50-hour course to train instructors to teach the first course, and led to the badge "Ready for Air and Chemical Defense, 2d Grade." [91] The first course was soon made available to persons who were not members of the Osoaviakhim. The badge was good for only 2 years, after which time it had to be renewed by passing the examination again.[92]

TABLE 1. OUTLINES OF GENERAL CIVIL DEFENSE TRAINING COURSES PRIOR TO 1955

1935 program (20 hours), estimated participation, 38 million persons:
1. General information on civil defense (4 hours)
2. Chemical defense (7 hours)
3. Medical and sanitary defense (4 hours)
4. Fire defense (3 hours)
5. Civil defense at home (2 hours)

1941 program (28 hours), estimated participation, 98 million persons:
Introduction (2 hours)
1. Defense against high explosive and fragmentation bombs (7 hours)
2. Defense against incendiary weapons (6 hours)
3. Defense against chemical substances (9 hours)
4. Duties and rules of conduct of the population under air defense conditions (4 hours)

Optional supplemental to 1941 program, introduced 1942 (6 hours):
1. Defense of the population against artillery and mortar fire (2 hours)
2. Defense measures and precautions to be taken upon discovery of unexploded bombs and shells, as well as mines laid by the enemy (2 hours)
3. Defense of the population against enemy use of nonaerial chemical weapons (2 hours)

1943 program (10 hours), mandatory supplement to 1941 program, official estimate of participation, 42 million persons:
1. Use of BN and GP–1 gas masks (2 hours)
2. Extinguishing incendiary weapons and fires caused by them (2 hours)
3. First aid to the wounded (2 hours)
4. Defense of the population against artillery and mortar fire (2 hours)
5. Defense measures and precautions to be taken upon discovery of unexploded bombs and shells, as well as mines laid by the enemy (2 hours)

Program in effect in 1953 (20 hours):
1. Shelters
2. First aid
3. Incendiary bombs
4. Extinction of fires
5. Extinction of incendiary weapons and fires caused by them
6. Toxic substances
7. Defense means against toxic substances:
   a. Gas masks
   b. Gas-proof shelters
   c. Use of improvised means to pass through a contaminated area
   d. Protection of water, food, etc., in the home against chemical attack

NOTE.—The above outlines cover only the programs for the badge "Ready for Air and Chemical Defense, 1st Grade" (except for the 1942 and 1943 programs, for which no badge was awarded). In addition, programs existed for a "2d Grade," designed for instructors teaching the above courses.

Sources: 1935 program from: Normy "Gotov k PVKhO" 1–i i 2–i stupeni. Moscow, Izd. TSS Soiuza Osoaviakhima, 1936, pp. 12–13.
1941 program from: Normy "Gotov k PVKhO" pervoi stupeni. Moscow, Redizdat TSS Osoaviakhima SSSR, 1942, p. 3.
1942 optional supplement from: Ibid., pp. 15–16.
1943 program from: Normy "Gotov k PVKhO," Moscow, Redizdat TSS Osoaviakhima SSSR, 1943, pp. 26–30.
1953 program reconstructed from: Voennye znaniia, 1953, No. 11, p. 21.
Numbers of persons taking the courses are estimated from the figures given in the text.

On July 2, 1941, a few days after the outbreak of the "Great Fatherland War," the Soviet Government issued an order making civil de-

[91] Ibid., p. 63.
[92] Ibid., pp. 10–11.

fense training mandatory. This decree provided that all residents of the country of both sexes between 16 and 60 were to be trained in a 28-hour course, and a simplified version was made obligatory for school children from 8 to 16. Workers and office employees were to be trained where they worked, students were to be taught at their schools, and the rest of the population was to learn at their residences. The heads of industrial and educational establishments were made responsible for the training of the personnel under their jurisdiction, while the instruction at residential buildings was entrusted to the Osoaviakhim.[93]

During the war, reportedly 98,410,000 persons took the course, and by the end of 1945, the total number of individuals who passed it since its inception was said to have reached 137,170,000,[94] although this figure possibly fails to allow for duplication for individuals who took the training more than once.

Actual warfare soon indicated fields in which training had not been provided in the prewar programs. An additional "optional" 6-hour course was therefore set up on February 8, 1942, covering such topics as artillery bombardment and unexploded bombs.[95] On March 23, 1943,[96] this course, expanded to 10 hours, was made mandatory for the entire population in addition to the program already given.[97] However, this supplementary course was taken by only 41,608,000 persons from 1943 to 1945, according to official statistics.[98]

After the war ended, training continued, the DOSAAF being set the task of providing instruction for the entire adult population; this program, however, admittedly lagged.[99] The course (20 hours in 1953) was conservative in nature; it not only failed to include material in the supplementary course of 1942, but also, in accordance with the Soviet military doctrine of the time, ignored the atomic bomb.[1]

Training since 1955

While the first instructions concerning atomic defense were issued to the population in 1954 by the MVD's Main Administration of the Civil Defense Service,[2] the DOSAAF entered the field only in the following year, when it undertook the presentation of the first of a new series of courses to teach the population of the Soviet Union in accordance with the revised concepts of civil defense. In 1956 it added defense against biological warfare to its program.[3] It published, also in 1956, a new edition of the instructions mentioned above, revised to include biological and chemical warfare,[4] and it has

[93] Izvestiia, July 2, 1941, p. 1.
[94] Za oboronu, 1946, Nos. 13–14, p. 2.
[95] Normy "Gotov k PVKhO" pervoi stupeni. Moscow, 1942, p. 15.
[96] Za oboronu, 1946, No. 5/6, p. 24.
[97] Normy "Gotov k PVKhO" pervoi stupeni. Moscow, 1943, pp. 26–30. (The program had been approved by the chief of the Osoaviakhim on Jan. 24, 1943.)
[98] Za oboronu, 1946, Nos. 13–14, p. 2.
[99] Pravda, Aug. 31, 1954, p. 1.
[1] Cf. Voennye znaniia, 1953, No. 11, p. 21.
[2] Cf. p. 41 ff.
[3] These changes in the DOSAAF's program necessitated a revision of its charter at its next general session (in 1958); the words "atomic and bacteriological" were inserted into the description of this phase of its training activities, which had previously read: "Preparation of DOSAAF members and of the population in all forms of air and chemical defense." (Sovetskii patriot, Feb. 13, 1958, p. 3.)
[4] Knizhnaia letopis', 1956, No. 62854. (Its Russian title is: Pamiatka naseleniiu po zashchite ot atomnogo, khimicheskogo i bakteriologicheskogo oruzhiia.)

sponsored the publication of a number of books and pamphlets on civil defense.

First course, 1955–56

The first course given by the DOSAAF on atomic warfare was approved on August 6, 1955,[5] and required 10 class hours. This program, generally known as "PAZ"[6] (the initials of the Russian words for "atomic defense"), concentrated on atomic weapons;[7] it provided basic information on the atomic bomb and means of defense against it, but also included some first-aid study and data on air-raid warning signals.[8] In contrast to the earlier programs sponsored by the DOSAAF, no badge was awarded.[9] In connection with this course, a "Teaching Aid on Civil Defense"[10] was published by the DOSAAF early in 1956.

The course was supposed to be taken by the population of the U.S.S.R. by the end of 1956.[11] An official Soviet statement claims that 85.5 percent of the population did in fact pass the course.[12] If this figure is accepted, and if it applies to persons from 16 to 60, it would mean that about 110 million persons in the Soviet Union passed the course successfully.[13]

Second course, 1956–59

Later, the population was required to take a more extensive second course consisting of 22 class hours; it was approved by the DOSAAF on August 15, 1956.[14] Training under this program started soon afterwards and was supposed to have been completed by December 31, 1958.[15] Some areas reported that they had finished the presentation of this course as early as February 1958;[16] in other regions training fell behind schedule and the deadline was not met. One of the reasons was that the stock of textbooks became exhausted and the DOSAAF's publishing house found that it would not be able to satisfy the demand until March 1959.[17]

The program is usually referred to as the "22-hour course"[18] or as "study in air defense."[19] It differs from the first course chiefly in including biological and chemical warfare.

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[5] Knizhnaia letopis', 1955, No. 47629. The title of the program was: Zaniatiia s naseleniem po protivoatomnoi zashchite v kruzhkakh pervichnykh organizatsii DOSAAF. (DOSAAF. Op. cit., p. 59.)

[6] DOSAAF. Uchebnoe posobie po MPVO. Moscow, 1956, p. 58.

[7] Sovetskii patriot, Feb. 11, 1958, p. 2.

[8] DOSAAF, op. cit., p. 59.

[9] Ibid.

[10] DOSAAF, op. cit.

[11] Sovetskii patriot. Feb. 12, 1958, p. 2. (No law covering this point has been located. Probably the legal basis for the program was the law of July 2, 1941, referred to above, which made such training compulsory.)

[12] Ibid., giving the text of a speech by Gen. O. Tolstikov.

[13] The number of men aged 15 to 59 in the Soviet Union and of women 15 to 54 in 1956 was estimated at 131,400,000. (Demetri B. Shimkin and Frederick Leedy in: Automotive industries, vol. 118, No. 1, Jan. 1, 1958, p. 59.)

General Tolstikov's exact words were "85.5 percent of the entire population," but it is likely that this statement is loosely worded, since this percentage, if applied to the total population of the U.S.S.R. regardless of age (200,200,000) would result in a figure of 171,000,000. This number appears to be unreasonably high in view of the age structure of the population, the fact that the DOSAAF does not yet have organizations in all districts of the U.S.S.R., and the likelihood that certain groups (the armed forces, school children, invalids, etc.) would be exempt from taking the course.

[14] Knizhnaia letopis', 1957, No. 40911.

[15] Sovetskii patriot, Feb. 11, 1958, p. 2.

[16] Ibid., Feb. 12, 1958, p. 2.

[17] Ibid., Jan. 11, 1959, p. 2.

[18] E.g., Sovetskii patriot, Feb. 11, 1958, p. 2.

[19] Obuchenie PVO. Cf. Knizhnaia letopis', 1957, No. 40911.

Third course, 1958–60?

Before the presentation of the second course was completed, a third training program for the population was approved by the central committee of the DOSAAF (on December 31, 1957),[20] and made compulsory for adults in the country.[21] It is supposed to be completed by the "basic mass" of the population before the beginning of 1960,[22] though, since the second course fell behind schedule, this deadline may also not be met. This time the course is called "Ready for Air Defense, First Grade," and a badge is awarded upon its completion.[23]

The basic purpose of the course, aside from reviewing the material covered in earlier training, is to provide practical experience, such as making the proper use of equipment.[24] The course consists of seven "norms" (with an additional one to be taught in rural areas), each devoted to a particular phase of civil defense. Twelve class hours (14 in the country) are officially called for, though it is freely admitted that more time will be required,[25] especially for the practical training.[26] Table 2 summarizes what each person is expected to know and to be able to do upon completion of the course.

TABLE 2

(Summary of the 1958–1960 course for mass training in civil defense in the U.S.S.R.)

First norm: Present-day methods of air attack (1 class hour)

(a) External characteristics of atomic weapons and their destructive features:
  What is a blast wave and what is its destructive effect?
  What is the heat effect and what are the defense methods against it?
  What is initial radiation, and what is its effect on unprotected individuals?
  What is radioactive contamination and what are the methods of detecting it?
(b) External features of the use of chemical weapons and their toxic characteristics.
(c) External indications of the use of biological weapons and their toxic characteristics.
  Basic methods for the use of biological weapons, evidence that biological attack has taken place, etc.
  How infectious diseases are spread.

Second norm: Individual defense means (1 class hour)

(a) Required knowledge:
  Design and use of gas masks.
  Improvised defense means and rules for their use.
(b) Required abilities:
  How to use a gas mask properly.
  How to determine the proper size of gas mask for oneself and for each member of one's family, and to select (or adjust) such masks.
  How to wear the gas masks in "walking," "alert," and "action" positions.

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[20] Cf. Knizhnaia letopis', 1958, No. 43362.
[21] Voennye znaniia, 1958, No. 10, p. 32.
[22] Sovetskii patriot, Apr. 9, 1958, p. 1.
[23] Ibid.
[24] Voennye znaniia, 1958, No. 10, p. 32.
[25] Ibid., 1958, No. 10, pp. 32–34.
[26] Thus, practice in using gas masks is planned on the basis of having the students wear them for 10 to 15 minutes the first time, "gradually" increasing the length of time to 1 hour; then to have them do their regular work for 10 to 15 minutes in masks, later raising the time to half an hour; and finally having them walk or ski in masks, men being required to cover a distance of 5 kilometers and women 3 kilometers. (Cf. Voennye znaniia, 1958, No. 12, p. 23.)

How to keep the glass parts of the mask from becoming blurred.
How to protect the gas mask and use it under winter conditions.
To be able to put the mask on properly from the "alert" to the "action" positions within 10 seconds for persons up to 55 years old, and 14 seconds for older persons.
To wear a gas mask continuously in a quiet state for at least 1 hour, or in a state of motion (at work) for not less than 30 minutes.
How to use a damaged gas mask.
To put a gas mask on a "wounded" person properly in less than 30 seconds.

(c) Improvised defense means and rules for their use:
Gauze and padded bandages (over the mouth).
Cloaks.
Other means.

Third norm: Collective defense means (2 class hours)

(a) Required knowledge:
Proper use of shelters.
Responsibilities of the detail assigned to service shelters.

(b) Required abilities:
To take refuge in a shelter on time.
To follow strictly and carry out all the required rules for conduct in shelters.
To make proper use of filtering and ventilation equipment in a shelter.
To lay out a trench or dugout under the instructor's supervision.
To employ the simplest tools in providing an exit from a shelter buried in debris (both from within and without).

Fourth norm: Fire prevention methods and extinction of incendiary weapons and fires (1 class hour)

(a) Required knowledge:
Aims and procedures in fire prevention methods.
The simplest fire extinction means and the rules for their application.
Method of summoning firemen when fire breaks out.
Methods of extinguishing incendiary weapons and incendiary aerial bombs.

(b) Required abilities:
To carry out fire prevention methods in the house, potential objective, place of work, etc.
To extinguish incipient fires, as well as incendiary aerial bombs, with the use of water from hydrants, sand, barrels of water, hydraulic hose and bucket, and fire extinguisher.
To summon firemen when fire breaks out.

Fifth norm: Rules for behavior of the population upon the announcement of the "Alert" and at the civil defense signals (2 class hours)

(a) Required knowledge:
Rules for behavior of the population upon announcement of the "Alert".
Measures to be taken after the announcement of the "Alert".
Civil defense signals and the order in which they are given.
Action to be taken upon the issuance of the various civil defense signals.

(b) Required abilities:
To prepare blackout equipment and carry out the blackout of buildings.
To carry out defense measures in one's own apartment.
To carry out sanitary measures.
To act quickly and correctly upon the signals "Alarm" and "Chemical attack" at work, in the street, in a public place, etc.
To protect food supplies, water, and fodder against contamination by radioactive, toxic, and bacteriological substances.
To hide safely in case of an atomic explosion if one is caught outside a shelter.

Sixth norm: First aid (3 class hours)

(a) Required abilities:
To use individual antichemical and bandage kits for first aid to the wounded (others and oneself).
To provide aid in case of shock, fainting, and concussion.
To carry injured persons in one's arms, in litters, and by improvised means.
To furnish first aid (to others and oneself) in zones which have undergone atomic, chemical, and biological attack.
To halt bleeding by various means.
To apply tourniquets in case of arterial bleeding.
To apply splints in case of bone fractures.
To apply a bandage in case of wounds or burns.

(b) Required knowledge:
Characteristics of injuries to people from atomic, chemical, or biological weapons.
Methods of providing first aid to wounded (others or oneself) in areas of atomic, chemical, or biological attack.
Rules for the use of individual antichemical and bandage kits and also of improvised means.
Rules for conduct in quarantine while under observation.
Carrying out sanitary treatment for various types of attack.
Providing artificial respiration by various means.

Seventh norm: Liquidation of the results of air attack (2 class hours)

(a) Required knowledge:
Methods and means for decontamination from radioactive substances, gas, and germ infection.
Rules for conduct in the attack zone.

(b) Required abilities:
Decontamination of one's house and household goods.
Decontamination of food products, water, and fodder.
Passing through contaminated areas.
Dragging persons out from under debris.
Proper conduct in an attack area.
Proper departure from an attack area.

Eighth norm: Provision of veterinary aid (2 class hours; this section is applicable in rural regions and on stock farms)

(a) Required knowledge:
Preventive veterinary measures in livestock enterprises and at home.
Methods and rules for providing veterinary aid.

(b) Required abilities:
To organize the defense of livestock and poultry from enemy attack.
To halt bleeding in wounded animals.
To apply splints and bandages to the wounds of animals in the case of fractures and dislocations.
To provide aid in case of burns and bruises.
To organize the evacuation of animals from burning buildings.
To provide aid to animals which have been attacked with radioactive, toxic, and bacteriological substances.

Sources: First and second norms from: Voennye znaniia, 1958, No. 4, pp. 32–33; third and fourth norms from: Ibid., 1958, No. 5, pp. 34–35; fifth and sixth norms from: Ibid., 1958, No. 6, pp. 14–15; seventh and eighth norms from: Ibid., 1958, No. 7, pp. 20–21. Number of class hours for each norm from: Ibid., 1958, No. 10, pp. 32–34.

Future courses

Two additional programs for training the population were announced in January 1959, having apparently been approved by the central committee of the DOSAAF at its meeting in December 1958.

One was designed for school children, and is called "Be Ready for Air Defense";[27] it is apparently scheduled to go into effect in

[27] Bud' gotov k PVO; the form of the Russian verb used is that applied to children.

the fall of 1959, since the textbooks to go with it are to appear in the second half of the year.

The second is a course leading to the badge "Ready for Air Defense, 2d Grade." It is a more advanced course for use in training the population (in contrast to the earlier "2d Grade," which was designed for instructors only). While few details are yet available, it seems to concentrate on training in the various specialties required in self-defense groups. The necessary materials for training instructors to teach this course are scheduled for publication in 1959.[28]

Instruction methods

The courses presented successively to the public in recent years have been given by the DOSAAF in cooperation with the Soviet Red Cross.[29] Groups of 20 to 25 persons are taught at a time, with lessons taking place once or twice a week, each lesson taking 2 hours. Arrangements for such lessons are made by agreements between the DOSAAF and the administrations of plants, educational institutions, apartment houses, etc., an approach which provides nearly full coverage of the population.[30] Motion pictures and filmstrips may be shown.[31] The necessary equipment, books, and teaching aids are supplied by the local committees of the DOSAAF and the Red Cross, with the cooperation of the government and nongovernmental organizations.[32]

The course concludes with a final talk by the instructor in the presence of inspectors from the DOSAAF and the Red Cross. Tests are then given to see how well the group has mastered the material. Individuals who receive unsatisfactory marks are enrolled in repeat courses.[33]

A special feature of the second [34] and third [35] of the current series of programs is the use of gas masks under realistic conditions. Students must wear the mask for an hour in a quiet position, and also must carry on their regular work, whenever feasible, for half an hour in gas masks, as well as walking or skiing some distance in such masks.[36]

In addition, they are supposed to use the masks in the presence of real poison gas for short periods. The local DOSAAF organizations are supposed to build gas chambers out of their own funds or adapt

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[28] Sovetskii patriot, Jan. 11, 1959, p. 2.

[29] Training in first aid is provided by the Soviet Red Cross. Founded in 1918, the organization is known by the full name of the "Union of Societies of the Red Cross and Red Crescent of the USSR" (Soiuz obshchestv Krasnogo Kresta i Krasnogo Polumesiatsa SSSR.) (The words "Red Crescent" were included in the name to attract the support of the Moslem minorities in the USSR.) With over 23 million members in 1957, the program of the Soviet Red Cross includes assistance to the population in times of disaster, training the people in first aid and other medical measures, and the preparation of nurses. (Bol'shaia sovetskaia entsiklopediia. 2d ed., vol. 40. Moscow, 1957, p. 223.)

[30] DOSAAF, op. cit., p. 58. (In higher educational institution teaching programs, time is allowed, at least in some cases, for civil defense classes. In one instance it totals 50 hours over a 5-year period. (Cf. program on "Economics and organization of socialist agriculture" taught currently at the Moscow Agricultural Academy named for K. A. Timiriazev, dated July 9, 1956.)

[31] The first film, "Atomic defense of the population" was released in 1956 (Voennye znaniia, 1958, No. 3, p. 32) and first shown on the Moscow television station on May 20, 1957. (New York Times, May 21, 1957, p. 6, col. 3.) Two additional films were released in 1958, and some filmstrips in 1957. (Voennye znaniia, ibid.)

[32] DOSAAF, op. cit., p. 58.

[33] Ibid., p. 58.

[34] Sovetskii patriot, Sept. 21, 1958, p. 3.

[35] Voennye znaniia, 1958, No. 6, p. 16.

[36] Ibid., 1958, No. 12, p. 23. (This type of training is not new. It was in use as far back as 1934. Cf. Khimiia i oborona, 1934, No. 10, front cover.)

21. The latest Soviet civilian gas mask.

22. A building containing a gas chamber for training purposes. The group in the foreground is receiving final instructions.

existing facilities for the purpose. How many such chambers actually exist is not clear. Thus, in the Ukrainian city of Nikopol', with 84,000 inhabitants,[37] a single gas chamber is used for the entire city.[38] In Armenia, such chambers are available in the cities and district centers.[39] A high DOSAAF official has recently complained that many local units do not have chambers available.[40]

The gas to be employed in such chambers is chloropicrin (nitrochloroform), one of the gases actually used in combat in World War I.[41] Under the current program, students, after preliminary examinations (including a physical one), are required to be given two tests while wearing masks, each of 5 minutes' duration. The first test takes place in a gas concentration of 0.5 cubic centimeters of liquid chloropicrin per cubic meter of air, the second in a concentration of 5 cubic centimeters. After the gas has been released in the chamber, the students are required to move their heads up and down, turn their bodies, and squat and rise several times. If anyone feels his eyes affected by the gas, he is immediately let out and examined by a doctor kept in attendance.[42]

How well people learn the use of gas masks in this course doubtless varies. The following comment was published concerning a group of oil storage workers in Nikopol' who recently were about to take the gas chamber test:

> We were convinced with our own eyes that not sufficient attention was given to the lessons on the use of gas masks. After the instructor gave the order "Gas masks!" we saw that a large proportion of the DOSAAF members had put on their masks improperly, and the instructor was forced to explain the mistakes in detail. Only after everyone had put on their masks properly did the instructor take the group into the gas chamber.[43]

Other aspects of the practical training called for in the current course are the putting out of fires, and practice in the use of equipment designed to decontaminate buildings and objects.[44]

The key figure in civil defense training is, of course, the instructor. He is appointed by the city or district committee of the DOSAAF, and may be simply a member of the DOSAAF staff or the local MVD civil defense organization, or else he may be an engineer, technician, chemist, teacher, physician, nurse, reserve officer or retired officer. Usually, he gives the instruction in addition to his regular work. After an instructor has taught 250 persons, he receives an award of the DOSAAF entitled "For active work."[45] DOSAAF instructors are themselves trained in a network of "civil defense schools" set up

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[37] Ukrainian SSR. Tsentral'noe statisticheskoe upravlenie. Narodnoe hospodarstvo Ukrains'koi RSR. Kiev, 1957, p. 12.
[38] Sovetskii patriot, Sept. 21, 1958, p. 3.
[39] Voennye znaniia, 1958, No. 10, p. 32.
[40] Sovetskii patriot, Nov. 30, 1958. p. 2.
[41] "Chloropicrin is a respiratory irritant and lachrymator. It is not as poisonous as some of the other gases, but it penetrates masks and respirators more rapidly. It was used [in World War I] with other gases for the reason that it produces nausea and vomiting. This forces the removal of the masks at which time the enemy is overcome by the more poisonous gases which have been fired." (Underhill, Frank P. The Lethal War Gases; Physiology and Experimental Treatment. New Haven, Yale University Press, 1920, p. 2.)
[42] Voennye znaniia, 1958, No. 6, pp. 16–17.
[43] Sovetskii patriot, Sept. 21, 1958, p. 3.
[44] Voennye znaniia, 1958, No. 10, pp. 33–34.
[45] DOSAAF, op. cit., p. 60.

throughout the country,[46] as well as in a central school in Moscow.[47] As each of the three training programs presented so far was approved, the DOSAAF simultaneously released programs for training the instructors to teach them.[48]

In evaluating the DOSAAF program, Soviet spokesmen, as usual, mix lavish praise with severe criticism. As an example of the latter, we may cite remarks made by General Tolstikov, the Vice Minister of Internal Affairs for civil defense, in February 1958:

> Together with positive examples, there are also serious shortcomings. Field inspections have shown that very little attention is given to the selection and preparation of instructors. Some of them have had only 2, 3, or 4 years of schooling. * * * Little attention is paid to the quality of the training given to the population. They are not supplied with material resources and teaching aids.[49]

The general congress of the DOSAAF in the same month also passed a critical resolution which stated:

> Serious shortcomings exist in the preparation of the population in civil defense. Committees [of the DOSAAF] are still effecting only a weak control over classes and the timely preparation of instructors, and do not make much effort to raise the quality of the training of the population in civil defense rules.[50]

The reaction of the Soviet public to the civil defense training program of the last few years, as far as can be gathered from Soviet sources, has taken varied forms. In some areas civil defense training courses are reported to be enthusiastically attended; in others, absence from classes is causing concern.[51] Then, there is the following comment made by a DOSAAF journal in June 1958:

> Unfortunately, a certain part of the population (an insignificant part, it is true) still has not gotten over the backward attitude that there is supposedly no escape from the atomic bomb, and that therefore allegedly there is no point in studying in civil defense classes.[52]

Training of Civil Defense Personnel

The training to be given to the military and nonmilitary personnel in the civil defense organization (as distinguished from the general courses given to the population) are characterized by considerable specialization and consequently great variety. Some persons are trained in firefighting, others in decontamination of territory, etc.

Services, etc.

The training of personnel in "services" [53] in the civil defense system is the responsibility of the local government authorities, while in-

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[46] Cf. Knizhnaia letopis', 1956, No. 19367.
[47] Za oboronu, 1947, Nos. 1–2, p. 8.
[48] The program for instructors in the first course is listed in Knizhnaia letopis' as No. 47630 for 1955; the second as No. 43355 for 1957, and the third as Nos. 36956 and 48398 for 1958.
[49] Sovetskii patriot, Feb. 12, 1958, p. 2.
[50] Ibid., Feb. 26, 1958, p. 1.
[51] E.g., ibid., Dec. 28, 1958, p. 2, and Nov. 30, 1958, p. 20.
[52] Voennye znaniia, 1958, No. 6, p. 1 (cf. also p. 92).
[53] Cf. p. 52 ff.

struction of the civil defense units based on industrial and economic enterprises of various types is directed by the heads of these establishments. The instruction follows directives issued by the agencies to which these bodies are subordinate. The city civil defense staffs appear to participate in such training.

Soviet sources describe two basic instruction methods—classroom (lectures and discussion periods) and practical work (demonstrations and experience). In some cases exercises are held involving the civil defense personnel in an entire plant, or sometimes that of a whole city (though not the general public).[54]

Civilians holding command posts may be trained by the MVD civil defense authorities.[55] Prior to the war, training of this type was also given in special schools run by the army;[56] no information has been found as to whether such schools now exist.[57]

Few references to the training for services and in factories have been found in Soviet sources. This may be because little is being done, or because of censorship.

Self-defense groups

The training of "self-defense groups" in nonindustrial establishments is generally a responsibility of the DOSAAF, since in most cases no administrative hierarchy exists to organize such training. An exception is made for educational establishments, where the training is handled by the principal or director. Certain specialties are taught by representatives of the Red Cross, or by workers from city's civil defense "services."[58] The training may include mock air raids, participated in by members of the group, with the personnel performing what they are supposed to do in case of attack.[59]

Militarized personnel

Since the Soviet civil defense organization was under the army up to World War II, it is likely that officers in the system were then trained in the army's aviation academies. No information on this point since the war has been located, but it is probable that a system of training establishments exists within the MVD.

Various refresher courses are presented and other measures are taken to maintain the officers' qualifications. Sometimes, in addition to general classes held at work,[60] there have been lectures, demonstrations, and practical training.[61] Games are said to be played on maps, and civil defense maneuvers are sometimes held, again without the participation of the civilian population.[62] In some cases, special courses have been given in capitals of republics for MVD personnel stationed throughout the area.[63]

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[54] DOSAAF, op. cit., pp. 205–210.
[55] Ibid., p. 219.
[56] Vestnik protivovozdushnoi oborony, 1940, No. 8, p. 40.
[57] Schools of this type would now presumably be under the MVD. The DOSAAF operates civil defense schools, but these appear to be limited to training instructors. (Cf. Knizhnaia letopis', 1956, No. 19367.)
[58] DOSAAF, op. cit., p. 55.
[59] Voennye znaniia, 1957, No. 12, p. 33.
[60] One such program in 1947 was described as consisting of a 30-minute period nearly every morning, with the subject matter assigned as follows: Mondays, physical exercise; Wednesdays, study of new rules and regulations of the Soviet Armed Forces; Thursdays, rifle practice; Fridays, staff training; Saturdays, political indoctrination. (Za oboronu, 1947, No. 3, p. 18.)
[61] Za oboronu, 1947, No. 3, p. 18.
[62] DOSAAF, op. cit., pp. 210–219.
[63] Za oboronu, 1946, No. 11, p. 14.

The training of the enlisted personnel in the militarized civil defense forces probably parallels that given in the army, since Soviet Army regulations are often applicable to the MVD forces.[64] During the war, in addition to regular military training, a number of civil defense troops were taught such specialties as plumbing, carpentry, painting, plastering, or bricklaying, these trades being important in the repair of air raid damage.[65]

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